

# **A Rationale for Organisational Effectiveness Assessment in Seaport Organisations**

**by**

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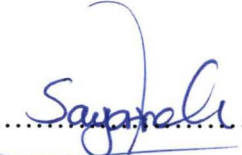



**In The Name of God,  
The Compassionate, The Merciful**



## DECLARATION

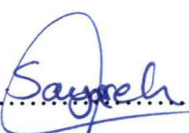
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## ABSTRACT

This thesis is concerned with the management of seaport organisations, the importance of regular Organisational Effectiveness (OE) assessments of these organisations and the benefits arising from such assessments. Therefore, this research introduces the concept of OE to seaport organisations, explores the rationale for regular assessment of OE in seaport organisations, examines the impacts of effective organisations on Operational Performance (OP) of seaports and ultimately on national development, and empirically develops an appropriate model for the regular OE assessment of seaport organisations. In other words, the main pioneering objective of this study is to introduce organisational effectiveness theory to port management practice.

This research involves a sequential triangulation of methods—both qualitative and quantitative approaches. Firstly, this allows for a qualitative exploration of historical data, development of a theory and hypothesising a model, and secondly for quantitative testing of the hypotheses and answering the research questions.

An extensive literature review on the impacts of transportation in general and seaports in particular on development was undertaken. This was followed by an in-depth search for different classifications and types of available OE models which finally led to conceptualisation of a model for assessment of OE in seaport organisations. A group questionnaire survey technique was used to collect the primary data from 225 of Iran's PSO managers at different branches to answer three major research questions. The SPSS software was utilised to analyse the collected data and make sense out of the raw data.

Key findings relate to implementation of regular OE assessment in seaport organisations, the benefits of such an assessment, the impacts of effective organisations on operational performance of seaports and eventually on national development, and the appropriateness of the model (and its OE criteria) conceptualised in this research to assess OE in seaport organisations. The analysis and discussion of the findings lead to conclusions with respect to the needs for seaport organisations and their managers to undertake regular organisational effectiveness assessment, as well as the implications for further future research. This research also provides some justification and impetus for all managers and organisations, either within or outside seaport organisations, to engage in the systematic process of assessing effectiveness, and perhaps enacting legislation, policies or procedures for obligatory periodical OE assessment of their organisations.

The significance of this research is enhanced by the absence of any empirical research on OE of seaport organisations and of any model specifically designed for assessment of OE in seaport organisations. Accordingly, this study is of significance as it introduces OE to seaport organisations and, for the first time, produces a model appropriate for the regular assessment of OE in seaport organisations which, in turn, should lead to improved OP.

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## Abbreviations

AMC	Australian Maritime College
ANOVA	Analysis of Variance
B.I.K	Bandar Imam Khomeini
BOT	Build-Operate-Transfer
BSc	Bachelor of Science
c.i.f.	cost, insurance and freight
CEEC	Central and East European Countries
CEO	Chief Executive Officer
CIS	Commonwealth of Independent States
DMEC	Developed Market-Economy Countries
dwt	deadweight
ECLAC	Economic Commission for Latin America and the Caribbean
ECMT	European Conference of Ministers of Transport
ECSA	European Community Shipowners' Association
EDI	Electronic Data Interchange
EIA	Energy Information Administration
ESCAP	Economic and Social Commission for Asia and the Pacific
GDP	Gross Domestic Products
GEP	Global Economic Prospects
GRP	Gross Regional Product
GT	Gross Tonnes
HPH	Hutchinson Port Holdings
IAPH	International Association of Ports and Harbours
INSTC	International North-South Transport Corridor
IRISL	Islamic Republic of Iran Shipping Line
IT	Information Technology
JIT	Just-In-Time
KPI	Key Performance Indicator
MARPOL	Maritime Pollution
MOE	Measure Of Effectiveness
MOP	Measure Of Performance
MSc	Master of Science

NITC	National Iranian Tanker Company
OE	Organisational Effectiveness
OECD	Organisation for Economic Cooperation and Development
OP	Operational Performance
OPEC	Organisation of Petroleum Exporting Countries
pa	per annum
PDF	Portable Document Format
PSA	Port of Singapore Authority
PSO	Ports and Shipping Organisation
RCPSO	Research Centre of Ports and Shipping Organisation
SCI	Statistical Centre of Iran
SOLAS	Safety Of Life At Sea
SSA	Stevedoring Services of America
TEU	Twenty-foot Equivalent Unit
UN	United Nations
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
YOTO	Year Of The Ocean

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# Chapter 1

## Introduction

---

### 1. Introduction

In the quest for organisational success, continuous improvement is desired in all organisations. Regardless of their activity (i.e. producing goods or services), all organisations seek to achieve higher output performance. This is the reason many organisational decision-makers concentrate on the quantity of output by producing more goods or services rather than focusing on the effectiveness of their organisations to improve the quality of output. In other words, Organisational Effectiveness (OE), which may be ignored by many organisations, can be a decisive factor in achieving a better performance. This implies that organisations should have a clear understanding of their effectiveness through regular OE assessment. The result of this assessment can be used to enhance their effectiveness in the future, and ultimately their performance. This proposition might be premature for an organisation unless one has a clear perception of OE, its constructs, its potential impacts, and its method(s) of assessment.

Organisational Effectiveness (OE) is a branch of organisation theory that emerged in early 1950s. It is a complex theory which has attracted the attention of many organisation scholars and researchers. OE became a school of thought for many organisational theorists, and a crucial step in the organisational assessment process, particularly from the 1950s to the 1980s. A few books have been produced (mainly edited collections), several hundred articles and book chapters have also been written. Almost without exception, each begins by pointing out the conceptual disarray and methodological ambiguity surrounding the construct of OE. Almost all acknowledge that little agreement exists regarding what OE means and how properly to assess it. Some writers have even become so discouraged by the literature on OE that they have

advocated abandoning the construct altogether in scholarly activity (Cameron & Whetten 1983a).

In the 1950s, OE was referred to ‘as the extent to which an organisation as a social system...fulfils its objectives’ (Georgopoulos & Tannenbaum 1957, p. 180). In the 1960s, OE was defined as the ability of an organisation to exploit its environment in the acquisition of scarce resources (Yachtman & Seashore 1967). In the 1970s, it was viewed as the relative ability of the members of an organisation to mobilise their centres of power towards productivity, adaptability, and flexibility (Mott 1972). As constructivist thinking became more standardised in organisational theory in the 1980s and 1990s, it was recognised that identifying organisational goals, for OE assessment, is more complex than it was first thought (Lusthaus, Adrien, Anderson, Carden & Montalvan 2002). Therefore, OE studies were directed towards multiple constituency models (Connolly, Conlon & Deutsch 1980; Gaertner & Ramnarayan 1983), which suggest that organisations are effective to the extent to which their constituencies are at least minimally satisfied (Lachman & Wolfe 1997).

Despite its chaotic conceptual condition, however, the OE concept is not likely to go away. According to Cameron and Whetten (1983a), there are theoretical, empirical, and practical reasons for this view:

- Theoretically, the construct of organisational effectiveness lies at the very centre of all organisational models. That is, all conceptualisations of the nature of organisations have been embedded within the notion of effective organisations, and the differences that exist between effective and ineffective organisations.
- Empirically, the construct of OE is not likely to go away because it is the ultimate dependent variable in organisational research. Evidence for effectiveness is required in most investigations of organisational phenomena. The need to demonstrate that one structure, reward system, leadership style, information system, or whatever, is better in some way than another makes the notion of effectiveness a central empirical issue.

- Practically, the construct of OE is not likely to go away because individuals are continually faced with the need to make judgements about the effectiveness of organisations.

Therefore, Organisational Effectiveness (OE) needs to be considered as a key prerequisite for organisations to cope, adapt, survive and compete in their businesses. This is very much so in the case of seaport organisations as the management of existing seaport organisations mainly focus on and monitor port operation performance through Key Performance Indicators (KPI), and simply ignore the evaluation of organisational effectiveness in their organisations.

## 2. Objective

This thesis sets out to introduce Organisational Effectiveness (OE) in the context of seaport organisations, and then to explore the reasons for regularly assessing the OE of Iranian port organisations (Ports and Shipping Organisation, PSO). In particular, the thesis seeks to determine the impacts of effective organisations on the Operational Performance (OP) of their ports, in relation to the organisation's location, managers' ranks and education levels. Further and most importantly, it aims to empirically develop an appropriate model to use for regular OE assessment in port organisations.

## 3. Background and Rationale

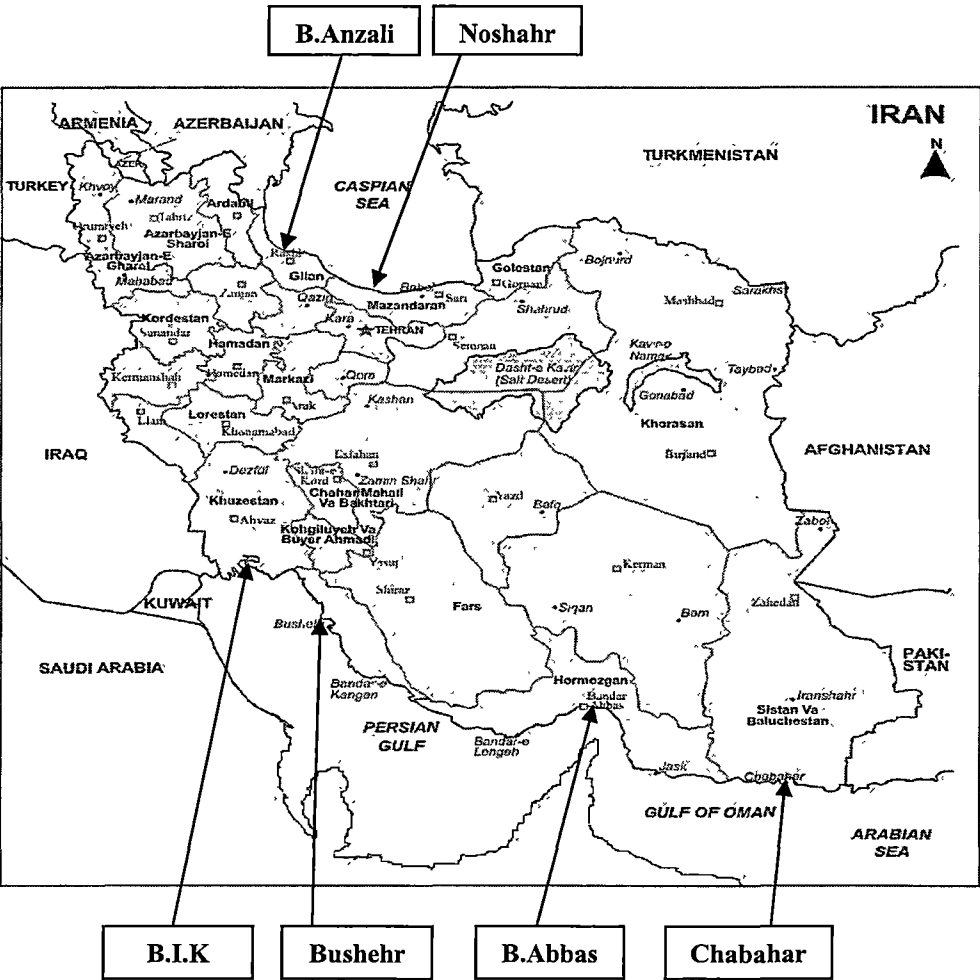
Organisations face multiple challenges and threats today more than ever before—threats to effectiveness, and performance; challenges from turbulent environments, increased competition, and changing customer demands; and the constant challenge to maintain congruence among organisational dimensions such as strategy, culture, and process. In this context, seaport organisations are no exceptions.

Iran, as one of the oldest maritime nations in the middleeast, has access to waterways in the North, South and Southwest (Caspian Sea, Oman Sea, and Persian Gulf respectively). This makes it a unique and strategically important country in the region in terms of cargo transit (through East-West and North-South corridors), the country's

imports and exports, and the carriage of goods and passengers by ships. These waterways connect the country to the world by six major, nine multipurpose and over one hundred minor seaports located along a coastline of about 2500 km.

The six major commercial seaports (Figure 1.1) handle, on average, more than 90 per cent of the country’s trade in terms of imports, exports, and transit of oil and non-oil cargoes. As these seaports are the country’s main gateways to the world market and vice versa, their contribution to the development (i.e. economic, social, etc.) of the country is considered to be highly significant.

Figure 1.1: Location of Iran’s Major Seaports



Despite the facts that the rich reserves of hydrocarbons, as well as other natural resources, alongside the country’s geo-strategic position make it a unique economy, Iran, like all other developing nations, is partially dependent on international and

overseas trade. The expansion of trade is a necessity for Iran's economic growth. Therefore, even from a commercial point of view, the existence and operationality of Iran's seaports are vital to the flow of trade and the country's development.

All Iranian commercial seaports are publicly owned, and are operated by Iran's Ports and Shipping Organisation (PSO). The PSO is affiliated to the Ministry of Roads and Transportation, and its president is the deputy to Iran's Minister of Roads and Transportation.

The PSO has six main branches in six major ports, which are centrally controlled from its headquarters in Tehran. That is, the structure of the PSO, as a typical public service entity, is centralised, and major decisions, strategies and policies are made in headquarters and then handed down to branches for implementation.

Iranian PSO is responsible for the infrastructure, the superstructure and heavy equipment; and either operates certain types of equipment or rents them to private operators that carry out commercial operations, while retaining all regulatory functions. However, in addition to these responsibilities, the PSO is the sole body accountable for the enforcement of a wide range of maritime laws and conventions (e.g. MARPOL, SOLAS), as well as being responsible for nautical training and competency issues.

The PSO with its vast operations and responsibilities, like any other port authority in the world, should strive to boost its potential, improve the quality of its services, increase the performance of its ports, fulfil its functions, cope with increasing demands, and play an effective role in the country's expedition towards development. In other words, the PSO's efforts should be channelled towards encouraging modern port development.

The success of the PSO in achieving these goals is not an issue here, but suggesting certain tasks to assist in the achievement of these objectives is the major concern. In this regard, a legitimate proposition is that these objectives may be more easily accomplished through an effective port organisation. This, however, necessitates a systematic approach for a thorough assessment of effectiveness in the PSO to find the current status of the organisation in terms of effectiveness.



Assessing/measuring effectiveness in service-oriented organisations, such as port organisations, is particularly difficult because of the dynamics involved in customer participation (Bowen & Jones 1986). ‘What makes measurement so difficult is that service firms must “count outputs” which are intangible’ (Kraft, Jauch & Boatwright 1996, p.105), and which are produced and consumed simultaneously. That is, services perish when produced such that they cannot be counted, inventoried, or tested.

The literature is filled with numerous models for assessing OE in different organisations. When it comes to seaports, the literature is studded with outstanding ideas on how successful ports might manage and market their business, how to improve their operational performance, and how to measure KPIs. But nothing has been done on the links between effectiveness of port organisations and achievement of their objectives, the ways of assessing organisational effectiveness for service-oriented port organisations, and the possible impacts of such assessment.

This, indeed, implies that a reason for Organisational Effectiveness (OE) being overlooked by the management of existing seaports might come from the lack of empirical research in this field.

As explained at the outset of this chapter, with all the disarrays, ambiguities, vagueness, elusiveness, contradictions, inconsistencies, and other controversies surrounding OE and its constructs, organisations cannot deny its existence, importance, and impacts. Therefore, the importance of OE, as well as the lack of empirical research in the area of OE in port organisations, calls for additional efforts to introduce OE to port organisations and conceptualise an appropriate OE model for regular assessment of OE in these organisations—an endeavour that is the main objective of this research.

Before identifying a systematic approach for this research, it is appropriate to briefly describe the fundamental ideas and plan of this study. First, as the concept of OE is believed to be totally new to port organisations, this study attempts to justify the usefulness of a regular assessment of OE in port organisations. Second, it seeks to evaluate the possible impacts of regular OE assessment in port organisations. Because these are carried through a survey of PSO managers, the research also seeks to study the effect of managers’ organisational geographic location (different PSO branches),

managers' ranks, and managers' educational levels on variables of the above two ideas (i.e. OE assessment and its impacts).

Third, although there is little consensus as to what constitutes a valid set of effectiveness criteria (Katz & Kahn 1978; Cameron 1986), there seems to be a general consensus that organisational effectiveness should be studied from a multidimensional perspective (Connolly et al. 1980; Goodman & Pennings 1980; Cameron 1986). Based on these facts, the principle that all organisations are systems and a systems approach is easily understood by all organisational stakeholders, this study also aims to identify the key factors/criteria which underlie the effectiveness of Iranian ports organisation, and then utilise them to propose a multidimensional system-based model appropriate for regular assessment of OE in Iran's ports organisation.

In summary, this research is a unique multidisciplinary study, which brings the perspectives of transport (e.g. transport geography, maritime transport, etc.), management, organisation theory, and social science disciplines to bear on particular areas of application and practice in seaport organisations.

## **4. Statement of Research Problem**

As discussed above, this thesis deals with different issues of Organisational Effectiveness (OE) assessment in port organisations. These issues include:

- The vital role of seaports, as an element of the transportation network, in connecting the national supply chain to the global marketplace and vice versa requires more effective organisations;
- Achievement of ports' objectives (e.g. improving the quality of its services, increasing port performance,...) necessitates a systematic approach for the thorough assessment of ports organisations effectiveness;
- No empirical research on organisational effectiveness of seaport organisations in general, and Iran's PSO in particular, has taken place in Iran or elsewhere;
- No empirical study on the possible impacts of OE assessment in port organisations has taken place; and

- No empirical research on designing a model of OE, especially for port organisations, has been conducted in Iran or elsewhere.

As noted, there are gaps in Organisational Effectiveness (OE) literature and port organisations studies. Therefore, any rigorous scientific investigation for bridging or closing these gaps will contribute to the improvement of seaport organisations.

The research setting is the seaport organisations and the organisations studied are PSO headquarters and all PSO branches in charge of the six major Iranian seaports.

## **5. The Research Questions**

The aims of the research can be summarised as seeking to answer the following three questions in the context of the Iranian PSO:

- Q1.** Why should the effectiveness of a seaport organisation be assessed/measured regularly? What is the relationship between this assessment and organisation location, managers' ranks and managers' education levels?
- Q2.** What are the possible positive impacts of improved operational performance of seaports on development, as a result of higher OE of their organisation? What is the relationship between these impacts and organisation location, managers' ranks, and managers' education levels?
- Q3.** How can the effectiveness of seaport organisations be assessed/measured? What are the appropriate criteria for assessing/measuring OE of Iran's seaports' organisation?

## 6. The Research Hypotheses

The above research questions posit the following research hypotheses:

- H1.** The result of regular assessment of OE can be used to improve seaport organisation's effectiveness, regardless of its location, managers' ranks and managers' education levels.
- H2.** Greater seaports' operational performance, as a result of higher OE, will have positive impacts on development, regardless of their location, managers' ranks, and managers' education levels.
- H3.** The correct criteria for assessing OE in seaport organisations can be identified and grouped into a meaningful system-based model comprising an Input phase, a Transformation phase, an Output phase and OE attributes (common criteria).

## 7. Significance of the Research

This study aims to explore the concept of Organisational Effectiveness (OE) in seaport organisations in general and Iran's PSO in particular, and is of particular significance because:

- It aims to help seaports improve by the introduction of OE to their organisations for the first time;
- It aims to produce a model appropriate for regular assessment of OE in port organisations for the first time;
- No empirical research on organisational effectiveness of seaport organisations in general, and Iran's PSO in particular has taken place in Iran or elsewhere;
- No empirical study on the possible impacts of OE assessment in port organisations has taken place; and
- No empirical research on designing a model of OE especially for port organisations has been conducted in Iran or elsewhere.

As this study will be the first academic research on the field of effectiveness of Iran's Ports and Shipping Organisation (PSO), the significance of the above points to the Iranian port administration is expected to be high, as are the outcomes of this research. Furthermore, this research could provide some justification and impetus for those who are involved in port planning and development to engage in the systematic process of assessing the OE of their organisations and to boost the individual's and organisation's effectiveness.

## **8. Organisation of the Thesis**

Prior to any discussion regarding the introduction of OE assessment to port organisations and its possible consequences on development, it is imperative to first comprehend the relationship(s) between transport and development, and second to understand the position of seaports and their organisations in transportation network. Chapter 2 looks at the relationships between transport and development, and investigates the potential impacts of transportation on development. Further, the chapter explores the role of transportation in developing countries. As the research is focused on the maritime mode of transportation, this chapter then narrows the discussion down to the different roles and effects of maritime transport in general and seaports in particular on development. Finally chapter concludes by presenting an overview of Iran's maritime capacity in terms of seaports and merchant marine.

Chapter 3 is devoted to the organisation of seaports, as crucial elements of maritime transport. This chapter reviews different types of seaport ownerships and administrations/authority that were/are being practiced around the world (i.e. traditional and contemporary). Finally, the chapter closes the discussion by describing the method of organisation of seaports in Iran.

Chapter 4 introduces the concept of Organisational Effectiveness (OE), which is the core theme of this research, by reviewing the subject's extensive literature. As the discussions in this chapter become the base for model-building, it also presents an in-depth review of major and influential OE studies from its emergence to the present date mainly from the perspective of service industry organisations.

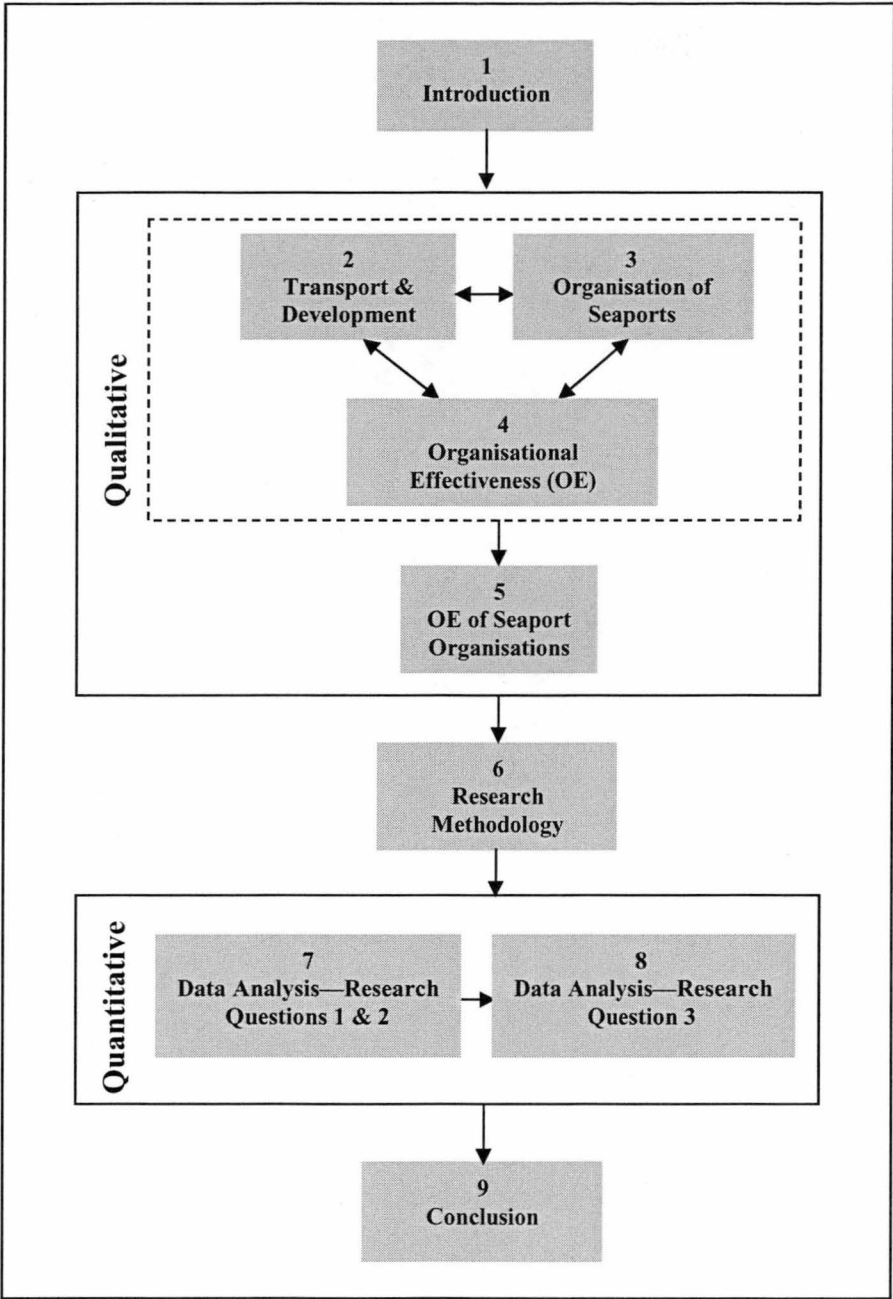
Chapter 5 initially makes a distinction between the most fundamental components of the organisational assessment process: effectiveness and performance. However, the aim of this chapter is predominantly to deduce a result from the survey of the literature presented in earlier chapters (i.e. 2, 3, and 4), thus generating a multidimensional system-based model for the regular assessment of OE in Iran's ports organisation. Further, it summarises the implications of the reviewed literature for research on OE of Iran's PSO.

Chapter 6 describes the methodology and design used to address the research questions and hypotheses. It focuses on the survey methods that are developed for both qualitative and quantitative approaches. The chapter, particularly, details the step-by-step development of the questionnaire as the main technique of primary data collection for this study.

The results of the analysis of collected data with respect to the research questions and hypotheses are presented in chapter 7 and 8. These chapters utilise the appropriate statistical techniques for analysing all variables to make sense of the collected data.

Finally, chapter 8 concludes this thesis by discussing the results, presenting conclusions and implications from the research, limitations and recommendations for further research. Figure 1.2 shows the structure of this thesis.

Figure 1.2: Organisation of the Thesis



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# Chapter 2

## Transport and Development

---

### 1. Introduction

The study of transport has been a long-standing theme for many researchers and transport geographers who viewed transportation as a major factor interlinked with the environment and with the spatial distribution and development of all other forms of economic and social activity. They consequently have seen restricted mobility as a brake on development in every sense and inadequate transport as a bottleneck to the full exploitation of the economic potential of the country or region (Button & Gillingwater 1986; Hoyle & Knowles 1998).

The basic definition of transportation is the physical movement of goods and people between points, but presently the inextricable links between transportation and development have broad ramifications that go beyond this basic purpose. Transportation represents one of the most important human activities worldwide. It creates valuable links between regions and business, between the population and the rest of the world. Transport is a multidimensional service, which affects several aspects of development. For example, the evolution of transport (improvement and development) has always been linked to economic development and job creation. Thus, transport is both a factor and a reflection of economic activity (Rodrigue 2003).

This chapter explores the positive and negative relationships between transport and development and elaborates on different impacts that transportation may have on the development of a nation with particular reference to developing countries. As this research is primarily interested in seaports, this chapter then examines the different roles and effects of the maritime mode of transportation and seaports on development.



Finally, it focuses on Iran's maritime capacity in terms of merchant marine and seaports with the aims of understanding their national impacts and providing the background context for the importance of the research.

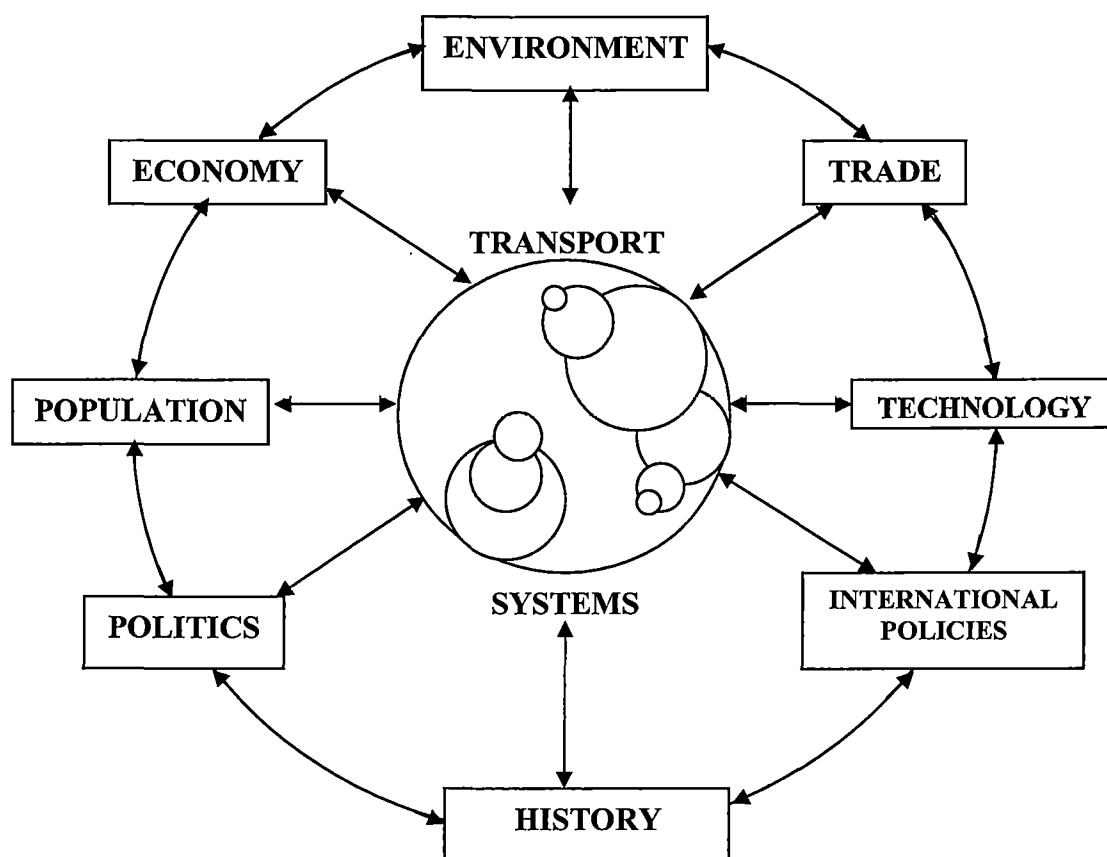
## **2. The Relationship between Transport and Development**

The ideas about the nature of the relationship between transport and development, and the role of transport in development began to emerge mainly in the 1960s. Transport was seen as a driving force behind development. Interestingly, almost all pioneers of transportation research (particularly, in the context of developing countries) commence their discussion with a citation from Lord Lugard (1922, p. 5) who stated 'the material development of Africa may be summed up in the one word—transport' (for example Hoyle 1973; Hoyle 1983; Button & Gillingwater 1986; Button 1993; Hilling 1996; Button & Hensher 2001).

The relationship between transport and development is multidimensional and there are many factors involved in the complex relationship between transport and development. Therefore, the transport system of a country or area cannot be explained by one factor alone, but by a series of interrelated factors (Hoyle & Smith 1998). The most important factors influencing the transport systems are shown in Figure 2.1. It should be noted that these factors affect transport in different ways and scale from local to global, and also influencing each other as well as affecting transport systems directly or indirectly. In other word, the transport-development relationship is a two-way interaction process. That is to say that transport is a result of development as well as a cause for development (Hoyle 1973).

Gauthier (1970) and Adler (1971) also distinguish three possible relationships between transport and development. The first they term positive where an innovation in transport is demonstrably responsible in a direct way for expansion of economic activity. The second is the permissive effect where transport does not itself stimulate economic growth but is such that it does not inhibit such growth when other stimuli are operating. The third relationship may be classed as negative; the situation in which the returns on investment in transport are less than from the same investment in directly productive activity with the possibility of an actual decline in per capita income (Hilling 1996).

**Figure 2.1: Some factors influencing the development of transport systems and the transport/development interface**



Source: Adapted from Hoyle and Smith (1998, p. 17)

As far as the transport and economic development relationship is concerned, transport is believed to be the “formative power” of national economic growth (Faust 1978), a powerful and decisive single indicator to economic take-offs in the United States, France, Germany, Canada and Russia (Rostow 1964), and responsible for the improvement of European economic systems (Andersson & Stromquist 1989).

Similarly, Hunter (1965) and Owen (1964) look back to the economic history of developed nations (Europe and North America) and infer that the effect of low shipping costs (as a result of the introduction of modern transportation) has been to widen markets and to permit economies of large-scale production in a wide range of activities. Even Hunter (1965) is so confident on the causal linkage between transportation and economic development that he believes the industrial revolution was successful because of a prior revolution in transport technology. However, Hilling (1996), Owen (1987),

and Hoyle (1973) go further beyond the classical view of transport role as an economic enabler, and observe transport as a complete package for accelerating the development process in economic, social, political and spatial dimensions. In this regard, Hilling (1996, p. 307) states:

There can be no doubting the all-pervasive influence of transport and in particular its critical role in the process of development in the broadest sense—economic, social and political. Transport is both the cause and effect of development and the precise nature of the interrelationship will certainly continue to provoke debate.

## **2.1. Impacts of Transport on Development**

The above discussion proves that there are relationships between transportation and development. Thus the impacts of transport cannot be easily neglected. According to a World Bank (1996) report, transport is crucial and central to development—without access to jobs, health, education and other amenities, quality of life suffers; without access to resources and market, growth stagnates and poverty reduction cannot be sustained. Conversely, inappropriately designed transport strategies and programs can result in networks and services that aggravate the conditions of the poor, harm the environment, ignore the changing needs of users, and exceed the capacity of public finances. In other words, the lack of adequate transport is counted as a major deterrent to growth (Chiu & Chu 1984). The UNCTAD (2003b, p. 5) outlines the impact of transport on development as:

Transport is of increasing relevance to the development of nations. It is a crucial determinant of production and trade patterns and consequently also of economic integration. For some countries it may also contribute to the generation of income through the provision of transport services. At present, intra-company trade and trade in intermediate products are growing faster than trade in finished goods. This trend is closely linked to improvements in transport and logistics services.

As previously explained, the impacts of transportation are multidimensional, ranging from economic, social and political to environment, population, trade, technology, etc. Despite the importance of all transportation-development relationship factors and their impacts on the development process, they are not all directly relevant to the scope of this research, and only those that are closely related to the core of this research will be examined.

### **2.1.1. The Impacts of Transport on Economic Development**

There are many factors involved in developing the economy of a nation or a region, i.e. land, raw materials, production, labour market, quality of life, tax incentives, environmental consideration, and so on. All of these may be essential in developing and improving the economy, but none is going to take place without transportation. 'Without transportation, there's no linking of resources and markets, there's no regional specialisation and resultant economies of scale, there is no economic development' (Brenner 1995, p. 22). Therefore, in general terms, it can be said that the structure and the speed of development of a national economy largely depends on the existence and quality of a transport system (Faust 1978), and consequently as an economy grows and develops it becomes more dependant upon its transport sector.

The linkage between transport and economic development is also an eminent topic that has generated much debate and considerable literature. A glimpse at the history also proves that improvements in the cost-efficiency of transport over the last 200 years have accounted for tremendous leaps in the pace and quantity of trade as well as expansion in economic activity (Andersson & Hasson 1998). In addition, there is a firmly held belief among policy-makers that transport, transport investment, and transport improvement promise economic development. Baum and Korte (2001, p. 48) contend that:

Mobility and transport are important requirements for economic prosperity. The mobility of people and goods provides for a more enhanced division of labour, increased productivity, structural change, greater competitiveness, growth in incomes and higher employment. Economic activity, reflected in higher productivity and consequent economic growth, is made possible by transport. In this chain of cause and effect, a policy of transport avoidance would present a risk to further progress in productivity and growth.

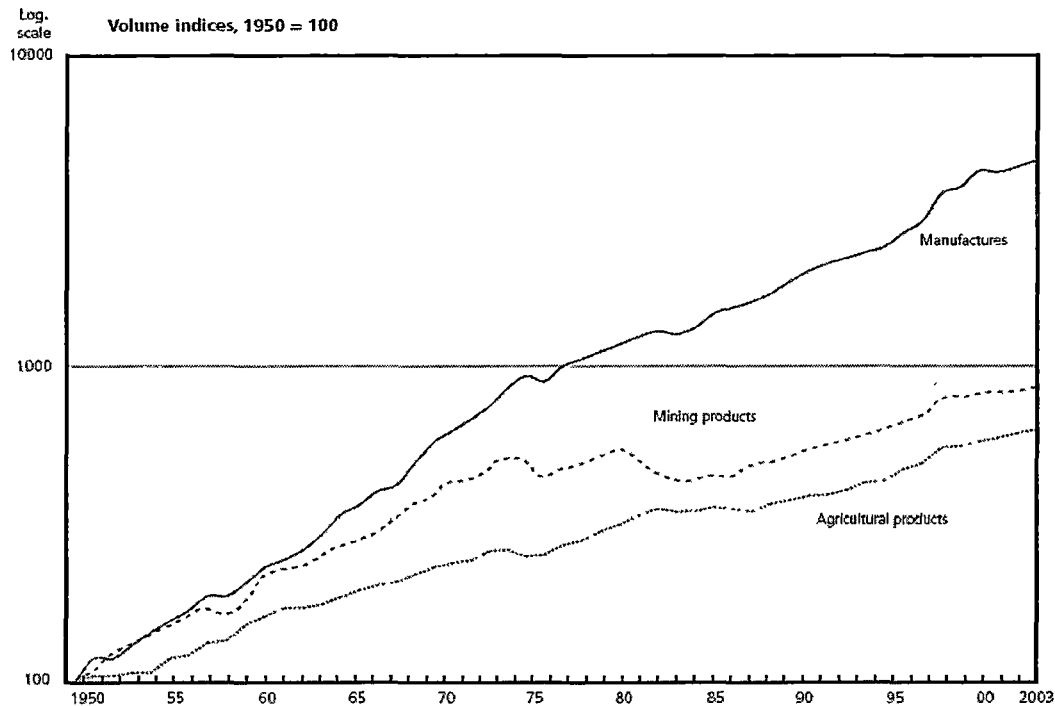
The dynamic nature of transportation, the important role it plays in improving the economy of a region, and its impacts on general development of a nation led the policy-makers to pay more attention to the issues related to the present and future needs of the transportation industry (e.g. infrastructure). The contemporary recognition of the growing importance of transportation and its impacts on an economy can be assessed

from many different dimensions such as growth of the demand, reduction of costs, expansion of infrastructure, etc. (Rodrigue 2003).

Efficient and effective production is the most important positive effect and result of transport on economic growth. On one hand, a good transportation system is vital to nation's economy because it links the geographical separation of production and consumption; on the other hand, as transport routes spread out geographically around a production point, they widen the market that can be served, and thus the volume of production can be increased and mass production techniques utilised, which in turn causes a massive reduction in total cost of goods being produced (McElhiney 1975).

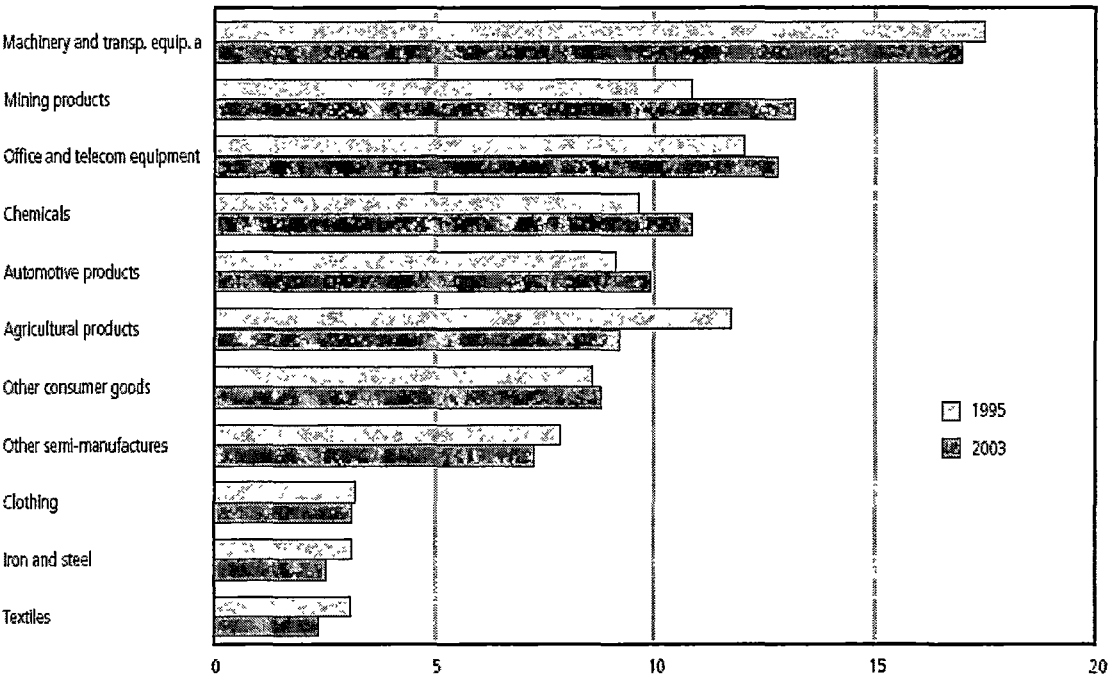
Increasing demand for transportation is another impact of transport in economic development. Firstly, demand for transport of goods and passengers increases more quickly than the GDP per capita. According to the World Bank (2004), value added by transport is estimated to account for 3 to 5 percent of GDP; in developing and transition countries, the demand for transport is growing 1.5 to 2 times faster than GDP; and in many developed countries, transportation accounts for between 6 to 12 percent of the GDP. Secondly, as a rule of thumb, a greater demand for a particular good or service means that at a given price greater quantities will be produced. Hence, greater quantities mean that the unit costs will decline because of economies of scale (Prud'homme 2001). Thirdly, the growing trend of world merchandise trade and increasing rate of global imports/exports (Figures 2.2 and 2.3 clearly indicate these trends), both in terms of value and volume, are significant causes of increased demand for transportation. International transportation systems, reciprocally, ought to support the growing demand of freight flows. These achievements could not have occurred without substantial advances in the transportation sector allowing a faster and more efficient transport of larger quantities of freight and people. Consequently, some support the idea that transportation may not be a necessary cause of international trade, but a means without which globalisation could not have occurred (Goetz & Rodrigue 1999; Rodrigue 2003).

Figure 2.2: World merchandise trade by major product group, 1950-2003



Source: Adapted from WTO (2004a, p. 28)

Figure 2.3: World merchandise exports by products, 1995 and 2003 (Percentage of total value)



Source: Adapted from WTO (2004a, p. 101)

Reduction of transport costs is the other significant issue in the relationship between transportation and economic development. Good transport offers low shipping costs

which permit wider markets to be served and the exploitation of large-scale production in an extensive range of activities (Goodbody Economic Consultants 2004). In this respect, Button (1993, p. 223) also comments:

Positive linkages between transport provision and economic development can be divided between the direct transport input and indirect, including multiplier effects. Good transport offers low shipping costs which have permitted wider markets to be served and the exploitation of large-scale production in an extensive range of activities.

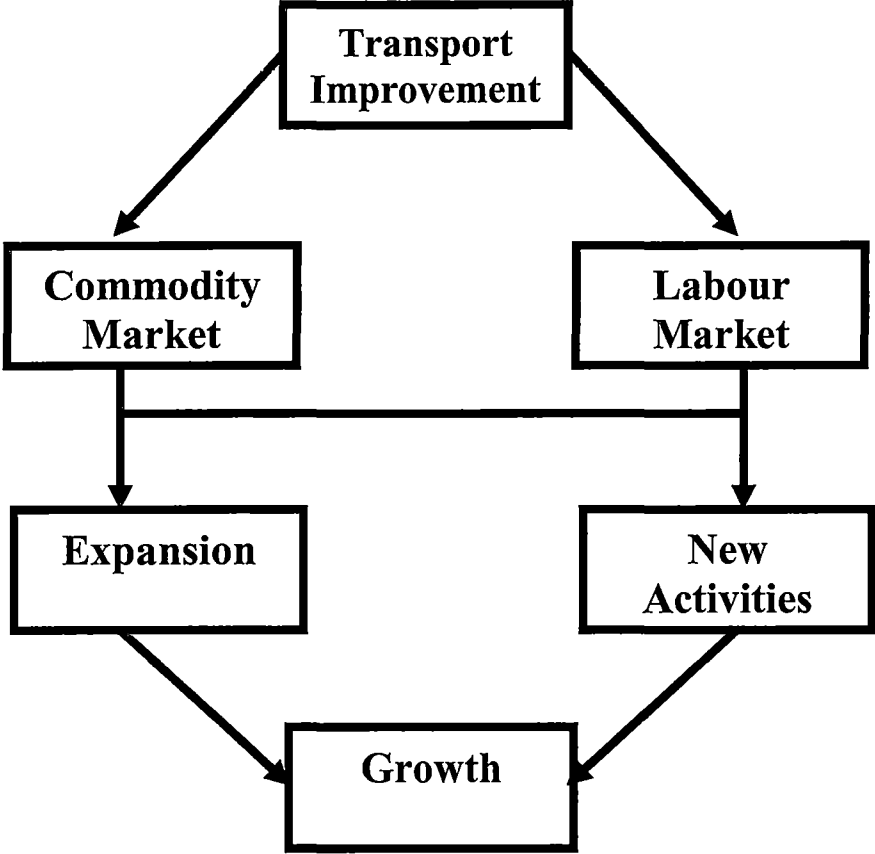
In addition to the above stimulus, competition (inter and intra mode) in the transport industry is also a further incentive that considerably accelerates transportation cost reduction. Inter and intra modal competition exists in various degrees and takes several dimensions. Different modes (or individual operators within a mode) of transport not only compete in terms of speed, accessibility, frequency, safety, and comfort, but also in terms of cost (Rodrigue 2003). Inter and intra mode competition enhances the efficiency of transportation as well as decreasing the cost of services provided by the transport industry—examples of competitive approaches in transport are the introduction of door-to-door and just-in-time (JIT) services.

Additionally, the impact of transport on economic development can also be assessed in terms of employment provided through the provision of a transport industry. In Europe, more than 10 million people across the continent work in the transportation sector, contributing 10% of European gross domestic product (EXTRA 2001). Transportation creates diverse job opportunities within the industry itself and in organisations that are dependent upon the transport industry, e.g. tourism, warehousing, insurance, and so on (Robinson & Bamford 1978).

Finally, at regional, interregional, and intra-regional levels, a reasonable transport system reduces commuting time and costs, which in turn cause labour markets to increase in size and efficiency. As transport time and costs fall, the search area for jobs increases regionally as workers are prepared to travel longer distances for the same cost, which may lead to lower wages, lower unit output costs, and increased employment (Goodbody Economic Consultants 2004). Accordingly, with the improvement of interregional transport, workers in peripheral regions can be motivated to commute to jobs in the core regions, increasing incomes in the peripheral regions while expanding

output in the core regions. Furthermore, at intra-regional level, transport creates an even larger intra-regional labour market with benefits to industry in the region as a whole (Haynes & Button 2001; Goodbody Economic Consultants 2004). So, good transport systems can impact both labour and commodity markets by making resources, customers, and labour more accessible. The result is an increase of the efficiency and market effectiveness of existing firms, leading to an expansion of output and employment. These relationships are illustrated in Figure 2.4.

Figure 2.4: Overview of transport impacts



Source: Adapted from Goodbody Economic Consultants (2004, p. 15)

2.1.2. Social Impacts of Transport

Transportation provides mobility and access. The demand for transportation is usually seen by economists and social scientists as derived in its nature; people desire transportation to move about and reach destinations while companies require it as part of their overall production activities (Button 2001). Transport is not only a service, but also a need. So, transport cannot be looked at solely as a means for a service but, on the



contrary, it is to be considered as an instrument to meet a need characterising human beings. 'Transport does not merely serve society, it shapes society, as in turn society shapes transport...Transport is inextricably linked to society and lifestyles; and the linkage is two way' (Lyons 2003, pp. 4-5). Social aspects of transportation may not be as important as its economic features, and therefore may not be counted as a prerequisite for development, but transportation and transport investments will be economically effective and prosperous only if favourable social conditions exist (Banister & Berechman 2000).

Transport systems and transport networks provide the means and opportunities to meet economic and social needs efficiently and equitably. As far as social aspects of transport are concerned, the primary goal of transportation is equity of accessibility and mobility for the community (Litman 2003). Increasing the access to and from different regions improves social cohesion. It also enhances employment and quality of life through the economic opportunities of better access to markets (EXTRA 2001). In this respect, Wilson (1973, p. 218) also urges that '...the greater the accessibility [to transport] or openness and the more people directly influenced by the [transport] facility, the greater the possibility of development'.

Button (1993) provides a list of transportation impacts and main reasons why people in the modern world desire to transport either themselves or their property. Out of his list, three reasons explicitly explain the social impacts of transport. First, without transport, social relationships and contacts are limited. Transport permits social interaction, and with it may come a greater understanding of the problems and attitudes of various geographically distant groups. Second, modern transport has widened cultural opportunities, permitting people to examine the artistic treasures of other countries and to explore their own national heritage. Third, transport is desired to permit people to live and work apart (White & Senior 1983); specifically it permits the geographical separation of employment from leisure. Transport, quite simply, widens the locational choices open to households.

Transportation is an essential element of industrialisation that raises income and expands export/import activities (Owen 1987). These transport-related activities, undoubtedly, improve the national economy and eventually social welfare not only in

terms of resources and commodities but also in terms of information, knowledge, and technology. Transport also generates social growth by facilitating access to health and education facilities as well as local and national amenities.

Finally, poverty reduction is another important social aspect of transport. Good transport policy contributes to reduce poverty in all its dimensions (i.e. malnutrition, ill health, illiteracy, vulnerability, physical isolation, and political and social exclusion) and stimulates economic and social development and inclusion (Gannon, Gwilliam, Liu & Malmberg Calvo 2001)

### **2.1.3. Political Role of Transportation**

Transport has always served a political role in the world and governments have used it as a tool to achieve their long-term goals. Internally, a country seeks good transport both to permit more effective defence of its borders and to improve the political cohesion of the nation; and externally, good transport permits a country to dominate any colonial or subservient provinces, while more aggressive states require transport to pursue their expansionist policies (Button 1993). Although some modes of transportation (especially aircraft and mercantile marine) are expensive to own and operate, politically, many countries have passed through a phase where the ownership and operation of modern transport infrastructure was treated as a symbol of power, status, and pride.

Rodrigue (2003) emphasises transport's political role and points out that while most transport demand relates to economic imperatives, many communication corridors have been constructed for political reasons. Hoyle and Knowles (1998, p. 8) also suggest 'there is often a conflict between the demand for transport and the political will to provide it, or political objective of a transport innovation and its economic purpose or value'. For example, the Trans-Siberian railway that was built to extend and consolidate Russian rule over the land-mass of Siberia (White & Senior 1983).

Apart from political motives, which compel the governments to adopt transport, governments play a critical role in transport as investors, decision-makers, and actors. Firstly, governments are a major source of capital for investment in transport

infrastructure; particularly when there are only scanty economic returns in view (White & Senior 1983). Secondly, the peculiar nature of the transport industry necessitates government intervention and involvement. Governments are usually involved in the regulation and deregulation of the supply of transport services, in the control of inter-modal competition, in safety control, in the coordination of investment allocation between modes and areas, and in decisions concerning pay and working conditions (Hoyle & Knowles 1998). Knowles and Hall (1998, p. 75) believe:

Most governments have intervened in the transport market for many years to protect customers and employees by introducing quality and safety controls, by controlling the quantity of services to ensure a comprehensive transport network, by controlling the price of services, by regulating the entry of new transport operators and sometimes by public ownership of transport companies.

## **2.2. Negative Aspects of Transport**

Despite all positive and targeted primary effects, transportation systems also can, and often do, have large negative effects on the economic, social and environmental systems they serve. The main pervasive negative effects at all levels and types of transportation, which effectively intimidate the sustainability of transportation, are those of traffic congestion, pollution (including air, water, noise and hazardous materials), and accidents (World Business Council 2001).

Gross estimations for land transportation (the dominant source of emissions) suggest that noise related costs account for 0.1 percent of GDP, health (social) from 0.04 to 0.11 percent of GDP, damage to structure and superstructure 0.07 percent, and between 0.1 and 0.16 for damage to natural environment (Rodrigue 2003). These negative impacts are even more evident in developing countries imposing greater burdens on the economy. Estimates further suggest that transportation systems in developing countries can have external costs in the range of five to seven percent of Gross Regional Product (GRP) (Willoughby 2000).

The excessive number and use of vehicles have led to high levels of traffic congestion. In this regard Boyce (2001, p. 3) defines congestion thus:

In effect congestion of transportation systems occurs when the demand for use of the system brought forth at the given generalised cost (time, money, risks, etc.) is excessive compared with the system's capacity or the supply of services available. Congestion is effectively the wasted time and expense of using an inadequately supplied transportation service.

Boyce (2001) further urges that even increasing the supply of transportation services may be counterproductive in that users may have an incentive to increase further their use of the service. Black (1998) also believes that providing more transport infrastructure stimulates more demand and any reduction in congestion due to the project will quickly be absorbed by demand, leading to a similar or worse level of congestion.

Another negative impact is environmental degradation attributable to transport. Major negative environmental effects of transport activities include air pollution, water pollution, noise, consumption of energy, land and other natural resources. However, these impacts are not solely caused by the operation and use of transport means, but also by the production and maintenance of vehicles, the construction of infrastructure, the provision of energy and fuel, and the disposal and decommissioning of vehicles (Nijkamp, Verhoef, Ubbles & Rodenburg 2001). World Bank (2002) estimates that suspended particulate matter, from different modes of transportation, leads to the premature death of more than half a million people per year, and the economic costs of air pollution have been estimated to be equivalent to about two percent of GDP in many countries.

The environmental impacts of transport differ significantly by mode. Land transportation is the dominant source of the emissions that have local and continental effects, and is accountable for more than 75 percent of the transport sector's contribution to global air pollution (World Bank 1996; Himanen 2001). Other transportation modes—rail, waterborne and air, have less impact on environment and are considered to be more environmentally benign than road transportation (Peet 1994; Michaelowa & Krause 2000).

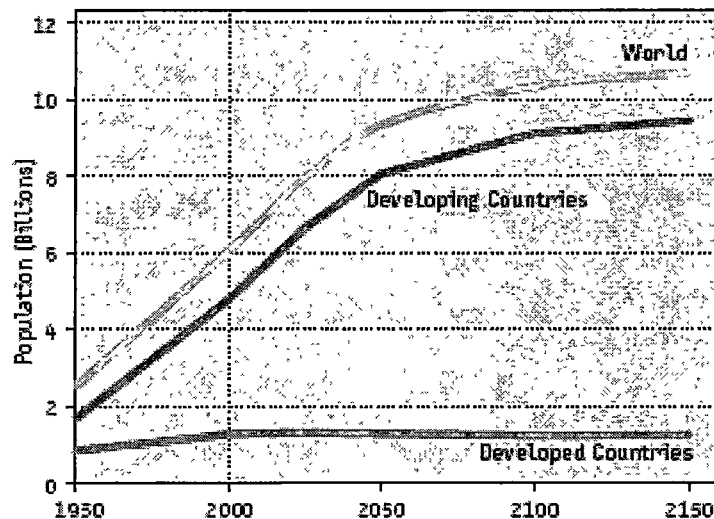
Societal concerns about the negative impacts of transportation on the environment have grown in recent years for a variety of reasons (Button 2001). Increases in scientific knowledge have given social awareness that many of the environmental implications of

transportation are harmful to health. Technology has also improved to offer ways of reducing the environmental effects of transportation. In spite of these developments, environmental threats from transportation remain a major public issue.

### 3. Transportation in Developing Countries

According to United Nations (2004) statistics, world population passed 6 billion in 2000. It is projected to grow to about 8 billion in 2025, to 9.3 billion in 2050, and eventually to stabilise between 10.5 and 11 billion. As can be seen in Figure 2.5, over 90% of future population growth will occur in the developing world.

**Figure 2.5: World Population Growth**



Source: United Nation (2004)

Even today, developing countries account for more than 80% of the world population, whereas developed nations host only a total of 17.1%. Table 2.1 compares developing and developed countries in terms of land areas and populations.

**Table 2.1: World Area and Population 2003**

Nations	Continents	World Area (%)	Population (millions)	Population (%)	Total Population by Nations (%)
<b>World</b>		100	6,314	100	100
<b>Developing Countries</b>	<b>Africa</b>	20.4	861	13.6	82.9
	<b>Asia</b>	30.0	3,831	60.7	
	<b>Latin America</b>	12.0	540	8.6	
<b>Developed Countries</b>	<b>North America</b>	16.7	323	5.1	17.1
	<b>Europe</b>	6.7	727	11.5	
	<b>Oceania</b>	5.3	32	0.5	
	<b>Antarctica</b>	8.9	0.0	0.0	0.0

Sources: Adapted from Hilling (1996); United Nations (2003); United Nations Population division (2003); Population Reference Bureau (2003)

World GDP is also expected to grow by 2.9% pa on average between 2000 and 2030 (Table 2.2). The rate of GDP growth in developing countries (Latin America, Middle East, Africa and Asia) is relatively more than that of developed economies over the same period. Despite the higher rate of GDP in developing countries, which beyond doubt can be an indication of the potential for development, the rise of population in these regions may not permit them to blossom to their fullest economic potentials. In addition, it should also be noted that transport costs determine potential access to foreign markets, which in turn explains up to 70 per cent of the variance in countries' GDP per capita (WTO 2004b).

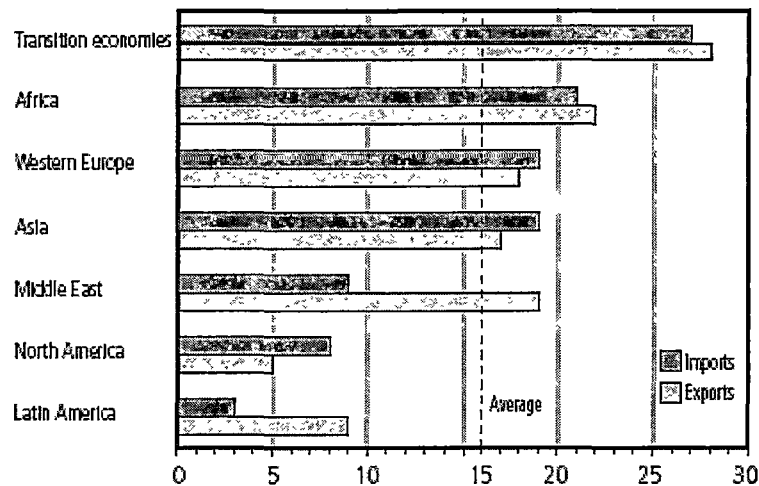
**Table 2.2: World population trends and world GDP change, 1990 to 2030**

	Population					GDP				
	Average annual growth rate (%)					Average annual growth rate (%)				
	90/00	00/10	10/20	20/30	00/30	90/00	00/10	10/20	20/30	00/30
North America	0.9	0.7	0.6	0.5	0.6	3.1	2.3	1.9	1.6	1.9
Europe OECD	0.5	0.2	0.1	0.0	0.1	2.0	2.1	2.0	1.5	1.9
OECD Pacific	0.5	0.3	0.0	-0.2	0.0	1.6	1.6	1.9	1.7	1.7
CEEC	0.1	0.0	-0.2	-0.3	-0.2	0.9	3.7	2.6	2.3	2.9
CIS	0.5	0.1	0.0	0.0	0.0	-0.5	3.3	3.7	2.7	3.2
Latin America	1.7	1.4	1.1	0.9	1.1	3.3	3.5	3.1	2.5	3.0
Middle East	2.6	2.0	1.7	1.3	1.6	3.5	3.8	3.5	3.1	3.5
Africa	2.8	2.3	2.1	1.8	2.1	2.4	3.1	3.2	3.1	3.1
Asia	1.6	1.2	0.9	0.7	0.9	7.1	5.5	4.3	3.4	4.4
<b>World</b>	<b>1.5</b>	<b>1.2</b>	<b>1.0</b>	<b>0.8</b>	<b>1.0</b>	<b>3.0</b>	<b>3.3</b>	<b>3.0</b>	<b>2.5</b>	<b>2.9</b>

Source: Adapted from European Communities (2003, pp. 24-25)

In terms of trade, Figure 2.6 depicts the annual percentage change of world merchandise trade in 2003. This figure illustrates the trends of developing nations in comparison with developed countries. Although the general performance of global trade was broadly shared by all regions, developing countries—in particular developing Africa, Asia and transition economies, recorded very strong recovery in merchandise trade for both import and export.

**Figure 2.6: World merchandise trade by region, 2003 (Annual % change)**



Source: WTO (2004a, p. 7)

According to WTO (2004a), international trade has been a growing trend in the global economy. While developed countries still account for 62.3% of exports and 67.5% of imports in 2003, developing countries have experienced their share climb to 37.7% of exports and 32.5% of imports, up from 30.3% and 33.9% in 1983 respectively (Table 2.3). Table 2.3 also reveals a dominance of a small number of countries over international trade, mainly North America and Western Europe. The United States alone accounts for about 18% of all global trades (13.7% of exports and 20.5% of imports). Further, Western European countries account for 43.1% of all global exports and for 42.0% of all global imports. A growing share is accounted for by the developing countries of Asia—26.1% of exports and 23.0% of imports.

**Table 2.3: Share of world merchandise trade by selected economy, 1983, 1993 and 2003**

	1983	1993	2003
<b>Exports (%)</b>			
<b>World</b>	100.0	100.0	100.0
<b>N. America</b>	15.4	16.6	13.7
<b>Latin America</b>	0.0	4.4	5.2
<b>W. Europe</b>	38.9	44.0	43.1
<b>E. Europe/CIS</b>	9.5	2.9	5.5
<b>Africa</b>	4.4	2.5	2.4
<b>Middle East</b>	6.8	3.4	4.1
<b>Asia</b>	19.1	26.1	26.1
<b>Imports (%)</b>			
<b>World</b>	100.0	100.0	100.0
<b>N. America</b>	17.8	19.7	20.5
<b>Latin America</b>	4.5	5.1	4.8
<b>W. Europe</b>	40.0	43.0	42.0
<b>E. Europe/CIS</b>	8.4	2.9	5.0
<b>Africa</b>	4.6	2.6	2.2
<b>Middle East</b>	6.3	3.3	2.5
<b>Asia</b>	18.5	23.3	23.0

Source: Adapted from WTO (2004a)

The dynamic growth of the global market creates both significant opportunities and threats for developing countries. With the growth of international trade and its ongoing integration, effective trade support services (e.g. transportation) should be provided to meet the demands effectively. Meeting the demands of international trade systems and driving the complex processes of trade transaction requires a range of trade support services that include management and control of freight movements, warehousing and storage of goods, custom administration, transaction documentation, and so on. The quality, cost, and efficiency of these services can have a direct impact on the landed costs of goods at destination and thus on the comparative competitiveness of countries aiming to export goods into the international market (CARANA 2003).

In general, goods exported from developing countries face higher freight costs than those from developed countries. Table 2.4 demonstrates the differences in freight costs as a proportion of the total of traded goods (imports) between developing countries and developed countries. On average, freight costs for developing countries are nearly twice as high as those in developed countries. In terms of exports, according to a study on trade and transport facilitation in central Asia by Malnar and Ojala (2003), the average cost of transport for developing countries' exports is about nine per cent of the total cost



of the traded goods, compared to just over five percent in developed economies. Malnar and Ojala (2003, p. 9) also distinguish that ‘the cost of transport of exports from landlocked developing countries is approximately 14.1 per cent, based on FOB rates and not considering the total costs including the most costly land transport leg. It is three times the rate of tariffs, and three times the cost of transport in developed countries’.

**Table 2.4: Estimates of total freight costs for imports in world trade by country groups (millions of \$ and %)**

Year	Country group	Estimates of total freight costs of imports	Value of imports (c.i.f)	Freight costs as % of import value
1990	World total	173 102	3 314 298	5.22
	Developed market-economy countries	117 004	2 661 650	4.40
	Developing countries—total	56 098	652 648	8.60
	<i>Of which:</i>			
	Africa	9 048	81 890	11.05
	America	9 626	117 769	8.17
	Asia	35 054	427 926	8.19
	Europe	1 909	21 303	8.96
	Oceania	461	3 760	12.26
2001	World total	364 008	5 960 595	6.11
	Developed market-economy countries	221 248	4 320 511	5.12
	Developing countries—total	142 760	1 640 084	8.70
	<i>Of which:</i>			
	Africa	13 806	109 125	12.65
	America	33 895	395 439	8.57
	Asia	92 023	1 102 663	8.35
	Europe	2 428	27 665	8.78
	Oceania	608	5 192	11.70
2002	World total	411 855	6 205 670	6.64
	Developed market-economy countries	255 531	4 430 379	5.77
	Developing countries—total	156 324	1 775 291	8.81
	<i>Of which:</i>			
	Africa	15 253	122 669	12.43
	America	37 740	379 225	9.95
	Asia	102 969	1 263 543	8.15
	Europe	2 718	31 201	8.71
	Oceania	645	5 653	11.41

Source: adapted from UNCTAD (2004, p. 71), based on data supplied by the IMF

According to UNCTAD (2003b), the difference in transport costs between developing countries and developed countries is mainly attributable to global trade structures,

regional infrastructure, logistic systems and the more effective distribution strategies of shippers from developed market-economy countries (DMECs). In other words, inadequate or deficient transport infrastructure, ineffective logistic systems and distribution strategies are three major drivers of higher costs of transportation in developing nations. Given that strong relationships exist between transport and economic development, as discussed in earlier sections, excess transport costs weigh heavily on the competitiveness of a country and a region.

In developing countries, infrastructure typically accounts for about 20 per cent of total investment and 40-60 per cent of public investment—over 25 per cent of infrastructure is for transport (Flora 1998).

Farmer (1986, p. 90) admits that ‘transportation development occupies a strategic place in the plans of the less developed countries of the world. One sure indication of underdevelopment is the inadequacy of the transport system’. This statement explicitly explains why expenditure on transport is frequently the largest single item in developing countries’ national budget, and why up to 40-60 per cent of public expenditure is devoted to transport infrastructure investment in these nations (Button 1993; Flora 1998). But poorly managed and maintained transport services in these regions undermine the competitiveness of manufacturing and distributing products, and impose heavy deficits on governments (Marber 1997; World Bank 2004).

Transportation infrastructure is regarded as one of the main instruments of the toolbox of spatial planners (Taaffe, Gauthier & O’Kelly 1996; Peeters, Thisse & Thomas 1998). Improving the capacity and standards of maintenance of existing infrastructure, and investing in new transport infrastructure will certainly contribute to lowering freight service costs and ultimately to the overall economic performance of developing countries (Aschauer 1989a, 1989b, 1989c, 1990a, 1990b; Munnell 1990a, 1990b; Eisner 1991; Lynde & Richmond 1992; Holtz-Eakin 1994; Evans & Karras 1994; Gramlich 1994; Moomaw, Mullen & Williams 1995; Gillen & Waters II 1996; Lall & Tay 1996; Talley 1996; Gillen 1996; Morrison & Schwartz 1996; Garrison & Souleyrette II 1996; Harmatuck 1996; Fernald 1999; Jiang 2001; Stough, Vikerman, Button & Nijkamp 2002). To put this into perspective, a white paper on transportation infrastructure,

freight services sector and economic growth (Lakshmanan & Anderson 2002, pp. 37-38) points out that:

When a major transport infrastructure investment is made in a country with limited stocks of...public capital, as in a developing country, there is transformational or developmental economic impact. Not only is the transport service associated with existing production and consumption activities made cheaper, faster, and more reliable, but a variety of new transport services which did not exist before are made possible. The latter effect derives from the pervasive consequences of the new *lower transport costs and enhanced market accessibility* that producers and consumers in the central and 'peripheral' regions (vis-à-vis the new transport link) experience now, and are able to find new and larger markets for their products—leading potentially to a virtuous cycle of economic effects and growth.

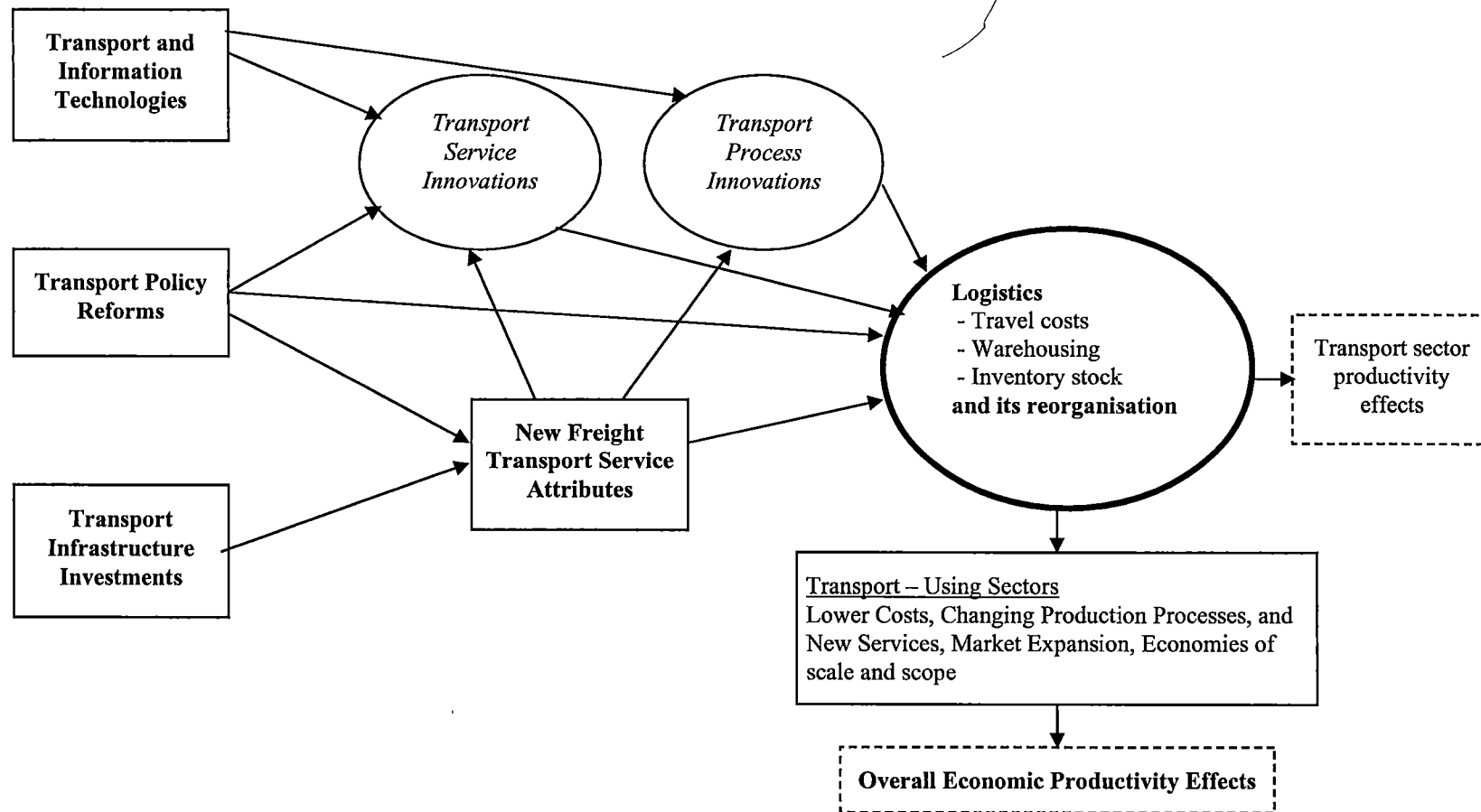
In order to illustrate how transport infrastructure investment effectively reduces the freight service costs in developing countries, Figure 2.7 outlines the complex and comprehensive linkages between transport investment, freight services and economic performance. It should be borne in mind that in addition to transport infrastructure investment, there are other driving forces associated with the freight industry. These are Information Technology (IT) factors and public policies of transport governance which, jointly with transport infrastructure investment, determine the nature and scope of freight services and thus their influence on overall economic performance of developing countries (Berechman 2001; Lakshmanan & Anderson 2002).

Nevertheless, infrastructure contributes only about five per cent to the total cost of provision of transport services (Bellier 2003). Thus, transport efficiency is also impacted by non-physical impediments. These include indirect transport costs of logistics such as customs, services, regulations, and so on, which are comparatively higher in developing countries. It goes without saying that the investments in infrastructure will never yield their full potential in improving international trade performance without parallel advances in these other cost factors of logistics (Bellier 2003).

'Trade-related transaction costs—freight charges as well as other logistical expenses—are a crucial determinant of a country's ability to participate in the global economy' (WTO 2004b, p. 181). To comprehend the level of difference between developed and developing nations in terms of transport logistics, Figure 2.8 provides a clear example

of customs clearance-waiting time in the developing world and OECD. This figure confirms that the costs of transporting developing countries' exports/imports to and from foreign markets are as much a hindrance to trade than are tariffs. Thus, new policies should be adopted in these countries to remove non-tariff barriers and accelerate the flow of goods and services across borders.

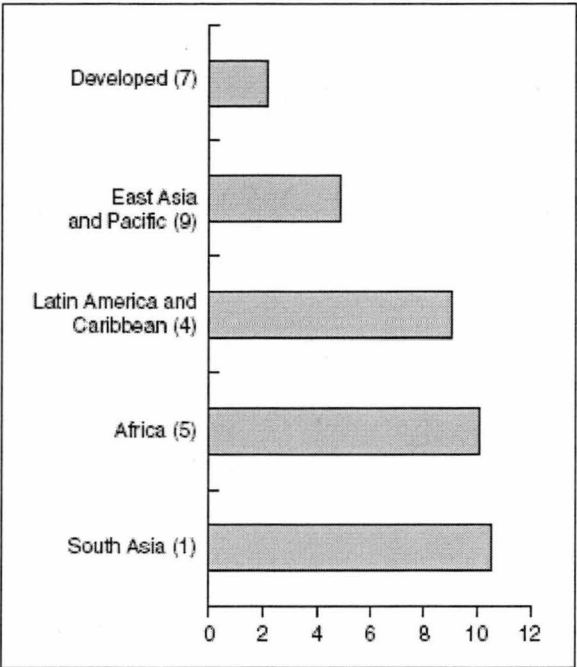
**Figure 2.7: Linkages between transport policy and investment, freight services sector and overall economic productivity**



Source: Adapted from Lakshmanan and Anderson (2002, p. 27)

**Figure 2.8: Customs clearance takes longer in the developing world than in the OECD, lowering the competitiveness of developing-country trade**

*Average day required for customs clearance by sea, by regions*



Note: the number in parenthesis indicates the number of countries selected from each region to calculate the average  
Source: WTO (2004b, p. 185)

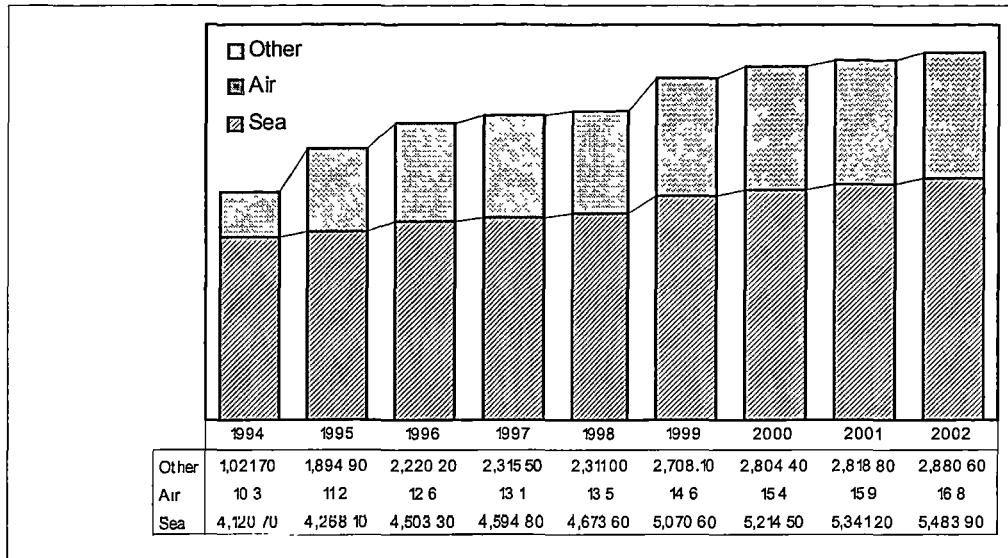
## 4. Maritime Transport

The importance of maritime transport tends to be overlooked by the public when compared to other modes of transport. This can be attributed to the general lack of understanding of the contribution of maritime transport systems to people’s daily lives as well as to national development. In many cases, as in international trade, there is no alternative to moving goods by sea. Therefore, most nations will gain economic and environmental benefits from enhancing the efficient use of maritime transportation systems—i.e. it can relieve congestion in other transportation modes; seaborne transportation is more fuel-efficient than other modes and reduces propulsion emissions (YOTO 1998). Furthermore, shipping can help to improve the foreign exchange situation, creates employment, fosters technology transfer and economic integration, and helps to reinforce national sovereignty. In addition to these direct effects, shipping investment substantially contributes to the diversification of the economy of the

investing country as it requires a whole range of support industries and services (Quality Quest 2004).

Maritime transport is the oldest form of mass freight transportation (Inamura 2001), and its greatest advantage is that generally it is the most cost-effective way of moving goods. In comparison with land modes of transport (road and rail), sea offers a ready-made carriageway for ships that does not require maintenance. In contrast to other modes of transportation, including air transportation, ocean vessels are capable of carrying far larger loads and far greater weights than can be handled by even the longest train, the most powerful truck, or the largest aircraft; accordingly ocean transport offers the cheapest fares of all forms of transport (Robinson & Bamford 1978). Therefore, despite the technical innovations that have transformed transportation—particularly in last two centuries, ships still remain the most economical means of moving large quantities of goods from one place to another. The logic behind the lower freight cost lies in the fact that maritime transport is basically a service, to the point that maritime shipping is a commodity. When a commodity is widely available in a global economy, price becomes the main advantage between the providers of this service on the transport market (Rodrigue, Slack & Comtois 1997).

In addition, competition and technological advancement in the maritime industry (i.e. ship design, containerisation...) have further helped lowering transport costs and making ocean transportation an unquestionable facilitator of world trade, growth and prosperity. Figure 2.9 illustrates the growth of global trade and its modal split into air, seaborne and other modes of transport.

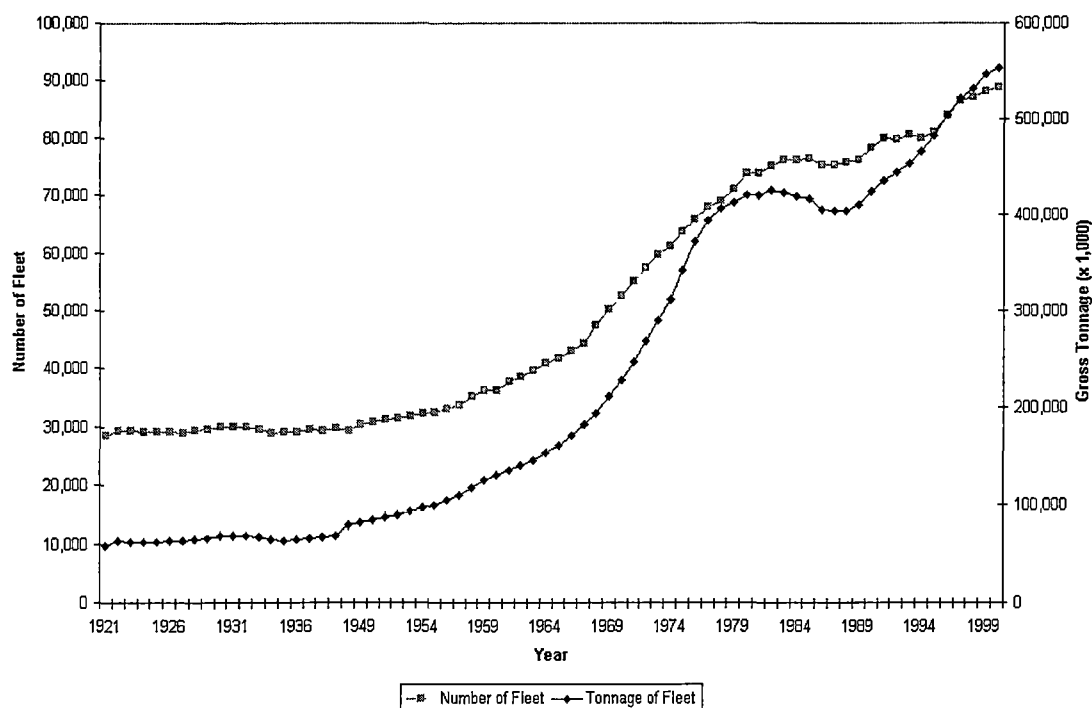
**Figure 2.9: World Trade by Mode of Transport, million metric tons**

Source: Adapted from Kumar, S. & Hoffmann, J. (2002), based on DRI-Wefa

The pattern of world shipping growth can also be utilised to simply indicate the evolution of maritime transport as a consequence of world trade growth. As Figure 2.10 indicates, the world fleet of merchant ships grew enormously throughout the latter half of 20<sup>th</sup> century to meet the demand from international trade. By end of the century, the number of ships in the fleet had increased from 28,433 in 1921 to 87,157. The tonnage of the fleet had grown even more—from nearly 59 million gross tons to more than 532 million.

The demand for maritime transport, like all other modes of transport, is a derived demand (Verhoef, Nijkamp, Rietveld & Lakshmanan 2004), which initiates a chain of economic activity that contributes greatly to international trade and overall to the national and international economy. The maritime industry provides not only an important service to trade; it is also an important trade in service for many countries of the world. That is, the relationship between maritime transport and international trade is two-way. On the one hand it serves the trade—it arrives in response to a perceived trading need, on the other hand and perhaps more importantly, maritime transport services also foster trade (Sturmey 1976). Therefore, it can be said that maritime transport plays a central role in the world economy and world trade, its growth is not unexpectedly strongly correlated with the growth of international trade, and shipping continues to be the dominant mode of transport.



**Figure 2.10: The growth of shipping in 20<sup>th</sup> century**

Source: Adapted from UN Atlas of Oceans (2004)

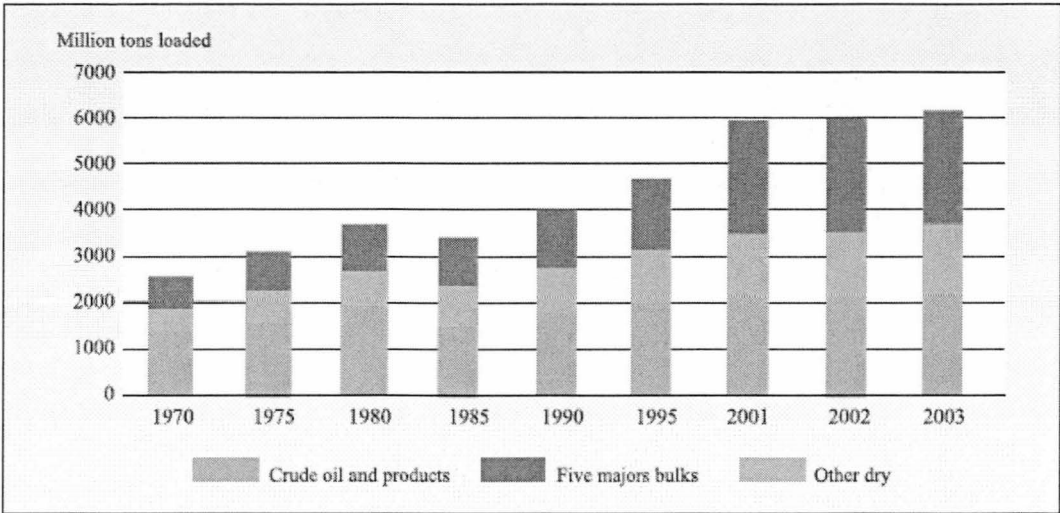
Transport researchers believe that transportation is one of the main cornerstones of globalisation, and within the transport industry, maritime transport is the most globalised mode. To understand the notion of globalisation in maritime transport, Kumar and Hoffmann (2002, p. 36) explain:

Most maritime transport is provided between two or more countries, and the service providers no longer need to be nationals of the same countries whose cargo they move. In fact, a simple commercial transaction may easily involve people and property from a dozen different countries: A Greek owned vessel, built in Korea, may be chartered to a Danish operator, who employs Philippine seafarers via a Cypriot crewing agent, is registered in Panama, insured in the UK, and transports German name cargo in the name of a Swiss freight forwarder from a Dutch port to Argentina, through terminals that are concessioned to port operators from Hong Kong and Australia.

As a result of the mutual relationship between globalisation and maritime transport, the demand for seaborne trade is evidently on an increasing trend. As outlined by UNCTAD (2004), world seaborne trade reached 6.17 billion tons in 2003 and was expected to increase in the future (Figure 2.11). The report reveals that the world output in 2003 grew by 2.6 percent, and the trend is expected to continue in the future. From these figures, a simple comparison between seaborne trade and other modes of transport

can be drawn to qualify and quantify the importance of sea transport over others. That is, maritime transport, as an important facilitator of world trade, is accountable for over 90 percent of all international trade by volume (WTO 2003; UN Atlas of Oceans 2004).

**Figure 2.11: Development of international seaborne trade for selected years**



Source: UNCTAD (2004, p. 5)

As far as shipping demand is concerned, UNCTAD (2004) statistical data illustrates a significant and continuously rising demand for sea transport and shipping services. According to UNCTAD (2004), total world's demand for shipping services stood at 24,589 billion ton-miles in 2003, a growth of about 18 percent over the 1995's figure (Table 2.5). The world merchant fleet of ships stood at 857.0 million deadweight (dwt) on 1 January 2004, representing a 1.5 percent rise over that of 2003, and a 3.8 percent expansion over that of 2002 (Table 2.6).

**Table 2.5: World seaborne trade in ton-miles, selected years**  
(billion of ton-miles)

Year	Oil			Iron ore	Coal	Grain	Five main dry bulks	Other Dry cargoes	World total
	Crude	Products	Crude plus products						
1980	8385	1020	9405	1613	952	1087	3652	3720	16777
1985	4007	1150	5157	1675	1479	1004	4480	3428	13065
1990	6261	1560	7821	1978	1849	1073	5259	4041	17121
1995	7225	1945	9170	2287	2176	1160	5953	5065	20188
2000	8180	2085	10265	2545	2509	1244	6638	6113	23016
2001	8074	2105	10179	2575	2552	1322	6782	6280	23241
2002	7848	2050	9898	2731	2549	1241	6879	6440	23217
2003	8330	2155	10485	3030	2700	1335	7429	6675	24589

Source: Adapted from UNCTAD (2004)

**Table 2.6: World fleet size by principal types of vessel, 2002-2004**  
(beginning-of-year figures, in thousands of dwt)

Principal types	2002	2003	2004	% change 2003/2004
<b>Oil tankers</b>	285 519	304 396	316 759	4.1
	34.6	36.1	37.0	
<b>Bulk carriers</b>	294 588	300 131	307 661	2.5
	35.7	35.5	35.9	
<b>Ore/bulk/oil</b>	14 456	12 612	12 110	-4.0
	1.8	1.5	1.4	
<b>Ore/bulk</b>	280 132	287 519	295 551	2.8
	33.9	34.1	34.5	
<b>General cargo ships</b>	99 872	97 185	94 768	-2.5
	12.1	11.5	11.1	
<b>Containerships</b>	77 095	82 793	90 462	9.3
	9.3	9.8	10.6	
<b>Other types of ships</b>	68 578	59 730	47 324	-20.8
	8.3	7.1	5.5	
<b>Liquefied gas carriers</b>	19 074	19 469	20 947	7.6
	2.3	2.3	2.4	
<b>Chemical tankers</b>	7 974	8 027	8 004	-0.3
	1.0	0.9	0.9	
<b>Miscellaneous tankers</b>	785	906	947	4.5
	0.1	0.1	0.1	
<b>Ferries and passengers ships</b>	5 319	5 495	5 561	1.2
	0.6	0.6	0.6	
<b>Other</b>	35 426	25 833	11 865	-54.1
	4.3	3.1	1.4	
<b>World total</b>	825 652	844 235	856 947	1.5
	100.00	100.00	100.0	

Source: Adapted from UNCTAD (2004)

It is the role of maritime transport in the process of trade creation that led many countries to own and/or foster their national merchant fleet. According to Hilling (1996, p. 282), in the post second world war period ‘there was a new stimulus and more positive approach to development and economic planning and the expansion of national shipping was seen as a critical element in progress towards greater economic independence’. Historically, the most developed and industrialised countries were those that had a large national fleet, manned by national seafarers, built in national shipyards and flagged at home (UNCTAD 2003a). However, globalisation and a highly competitive shipping industry has changed this view in many developed nations. For these nations, the emphasis is not in the size of their fleet or their tonnage, but on eradicating the barriers to the through movement of cargoes (Kumar & Hoffmann 2002). Table 2.7 illustrates the precipitous decline in the shipping fleet registered in most traditional maritime nations, as of end of 2000 to 2002. This decline is in direct contrast to the growth made by fleets registered in open registry nations and developing countries.

**Table 2.7: Maritime engagement of traditional maritime nations, end of 2000 and 2002**

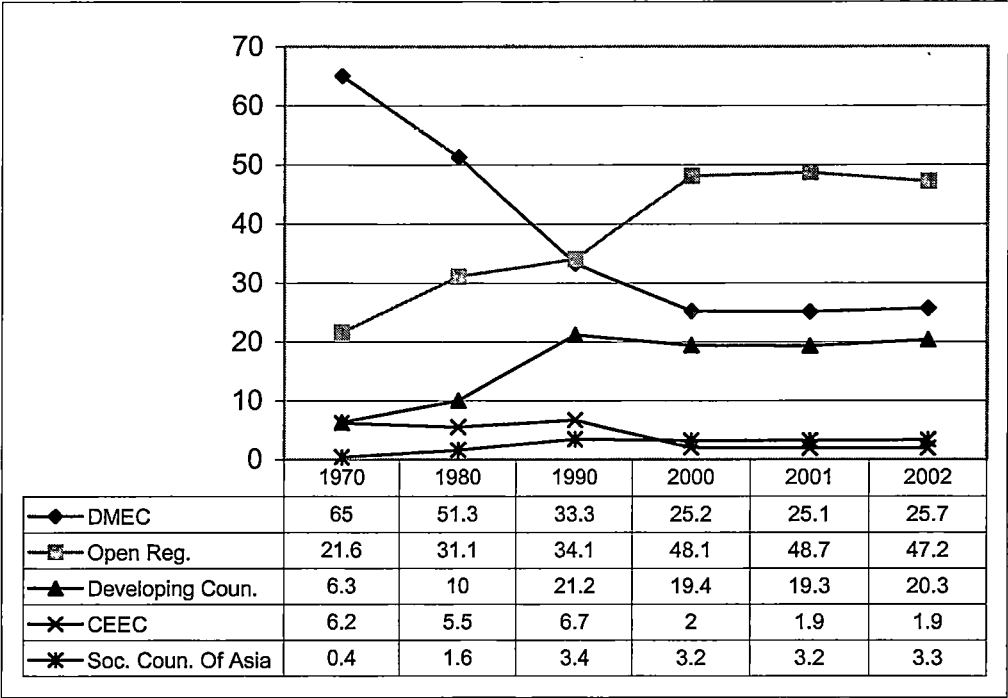
Country	Percentage value share of world trade generated		Percent share of world fleet in dwt	
	2000	2002	2000	2002
<b>United States</b>	15.7	14.5	7.87	5.0
<b>Germany</b>	8.1	8.4	4.11	4.8
<b>Japan</b>	6.6	5.7	12.74	12.4
<b>France</b>	4.6	5.0	1.48	0.7
<b>United Kingdom</b>	4.7	4.7	3.76	2.1
<b>Italy</b>	3.6	3.8	1.84	1.5
<b>Netherlands</b>	3.1	3.5	0.85	0.9
<b>Belgium-Luxembourg</b>	2.9	3.1	0.99	1.1
<b>Spain</b>	2.0	2.1	0.71	0.5
<b>Russian Federation</b>	1.1	1.3	2.09	1.9
<b>Norway</b>	0.7	0.7	10.90	6.9

Source: Adapted from UNCTAD (2001; 2003b)

While the traditional maritime giants are losing their interests in fleet ownership, a new group of nations have proactively enacted maritime policies that favour their shipping base—e.g. South Korea, Singapore and Taiwan (Kumar & Hoffmann 2002). Figure 2.12 depicts the decline in the rate of ship registration over the last three decades in

Developed Market-Economy Countries (DMEC) and Central and East European Countries (CEEC) in contrast to its growing trend in open registry, developing, and Asian socialist countries. This trend shows that the principles of spectacular growth and development in maritime sector still continue to evolve. The players have changed by shifting the ownership, operation, and capital from traditional maritime nations to new players in developing countries.

Figure 2.12: Ship registration trends (%)



Source: Created with data from UNCTAD (2003b)

Another important event, in the history of maritime transportation, is the emergence of containerisation. Since the 1960s, containerisation and its growth has revolutionised the transport industry in general, and ocean transportation in particular. It has given rise to significant economies in the transport chain by permitting freight to be transported more cheaply and further than ever before. Although the change to containerisation was not easy, improvements in handling cargo have evolved further than many expected from the initial concept; containerisation penetrated the cargo-handling business such that, today, some grains and other bulk products are handled by containers (Brooks 2004a).

The introduction and improvement of containerisation has lowered carriers' unit costs in international ocean transportation, served as an engine for the dramatic increase in

international trade (World Shipping Council 2001), simplified the process of transshipment between different modes of transport, opened up the creation of multi-mode door-to-door transport, and become a pre-condition for the internationalisation of subcontracting and just-in-time production systems (Pedersen 2000). Furthermore, Thomas (2001, p. 559) goes deeper into the impacts of containerisation and presents a full range of containerisation effects:

Containerisation has radically altered ocean transportation, changing trade patterns, ship routing and itineraries, ship design and size, cargo-handling equipment and operations, inland transport and freight terminals, commercial practices and customs procedures, employment and working practices, and information and communication systems. But containerisation's greatest impact has been on ports and the way they accommodate container carriers and handle cargoes.

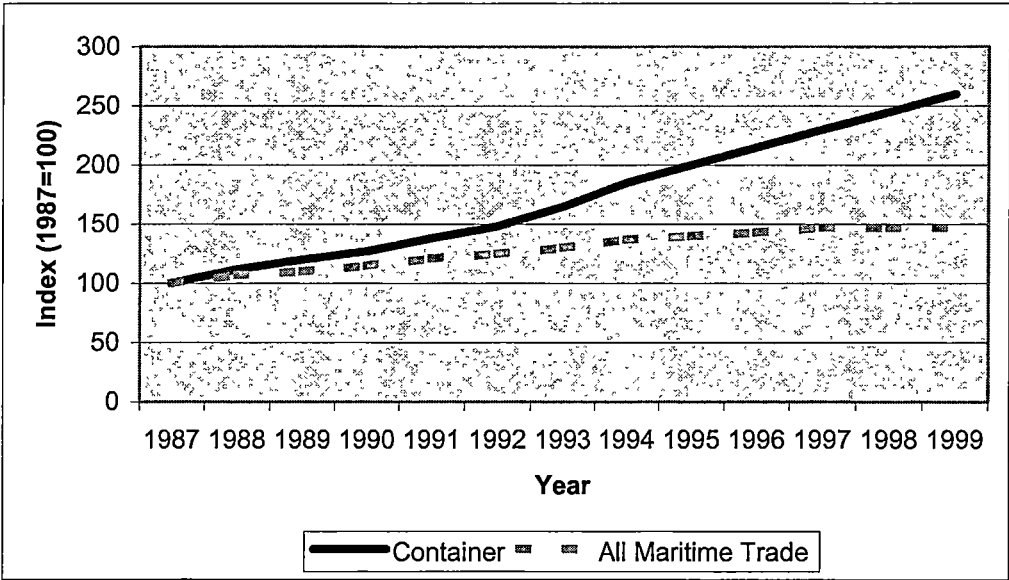
More than 60 per cent of world general cargo trade moved by sea is carried in containers. On trades between highly industrialised countries the percentage exceeds 80 percent (World Bank 2001a). According to ECLAC (1998), one of the major factors that led to the worldwide acceptance of containerisation was the increase in the speed of loading and discharging operations permitting faster vessel turn-around and more intensive utilisation. This epitomises the view that any attempt by operators of general cargo vessels to reflect the characteristics of trade demand and reach new levels of scale economy was restricted by slow loading and discharge rates.

Containerisation has also led to an increase in vessel size, and consequently to development of ports' infrastructure to accommodate large vessels and cargo handling systems to serve them. Containerships introduced into service in the 1960s with the capacity of less than 500 TEUs, have been replaced by ships that can carry over 8,000 TEUs (World Shipping Council 2004). It is predicted that by 2010, the emergence of containerships with carrying capacity of 13,000-15,000 TEUs are possible (YOTO 1998; Brooks 2004a). It is commonly believed that the larger the vessel, the less will be the expenses and the greater will be the revenues.

To understand the intensity of containerisation, Figure 2.13 compares the growth of worldwide maritime trade with that of container trade over the period 1987 through to 1999. Total maritime volumes grew at an average of 3.3 percent per annum over the period, with the result that by 1999, total seaborne trade had increased by approximately

50 percent over 1987 volumes. Containerised cargoes, in contrast, grew at an annual average growth rate of 8.3 percent per annum over the same period, leading to an increase around 160 percent in total maritime container movements (ESCAP 2001). This increase in containerised transport is forecast to continue well into the future. In 2002, the world seaborne container trade increased by 8.4 percent to 75.8 million TEU (UNCTAD 2003b), well over the forecast figure of about 70 million TEU (ECLAC 1998; ESCAP 2001; ECSA 2002). ESCAP (2001) predicts that container trade will continue to grow, but at a slower rate of 6.3 percent per annum. With this growth rate, the total number of full containers shipped internationally is expected to reach to 122.7 million TEU by 2011, up from 75.8 million TEU in 2002.

Figure 2.13: Growth of world maritime trade (1987-1999)



Source: Adapted from ESCAP 2001, based on Drewry Shipping Consultants and OECD Maritime Trade Statistics.

The evolution of containerisation has revolutionised the role of seaports and their operation. As a result of containerisation, some ports set out to develop into hub ports to provide more services and secure higher profit. Zeng and Yang (2002, p. 164) claim that:

The concept held in the past about port operations (that a certain cargo must be handled at a certain port and a certain port has its certain limited hinterland) has totally changed with the development of containerisation and more and more ports are trying to develop into hub ports. The port profit becomes better as the throughput increases by transshipment between the major ocean shipping liner and

feeder liner, which is simpler than the traditional service for the hinterland. The hub and spoke mode is feasible economically because of the economies of scale brought by large liners and highly automated hub ports....

This reinforces the fact that containerisation brought a homogeneous service, and therefore made it easier for shipping lines to enter new markets, using gearless vessels and even without having experience of transporting a particular type of cargo, because in most ports the same containers are handled by the same type of ship and gantry cranes (ECLAC 1998).

Port competition has also fiercely intensified under containerisation; i.e. intensified in attracting and retaining shipping lines. Ports were obliged to enter the container industry by improving infrastructure to reduce the time and cost of ship calls, and thus to secure a competitive advantage, otherwise ships might call at a rival port (Talley 2000; Slack 2001).

In summary, it can be shown that the development of containerised transport has been an important technological change in the transport sector in the last few decades. As a result of containerisation evolution, containers have allowed less cargo pilferage and damage, faster and more reliable transportation service, reduced freight rates, large cost reduction in cargo handling, increasing cargo transshipment. In turn, these improvements have induced the creation of hub ports that allow countries or regions to take advantage of increasing return to scale (Talley 2000; Clark, Dollar & Micco 2001).

## 5. Seaports

It was revealed that shipping has a direct bearing on the development process of a country. Where there are ships there are bound to be seaports as areas/terminals within which ships are loaded and/or discharged of cargo. Seaports are principal interchange points for both domestic and international freight movements. Seaports are assumed to be a link in the transport chain providing an interface between transportation modes (Alderton 1999). However, the world's seaports are much more than places for transferring cargo between different modes of transport as they offer a wide range of activities to exploit potential economies of scale to a much greater extent than other modes of transport (Goss 1990a). That is, seaports are more than just a cargo-handling



facility; they are also engines of local and regional economic development and safe heavens in inclement weather (Brooks 2004a). They act as gateways to access international markets by serving importers and exporters in global distribution networks, which in turn allows the country to exploit the advantages of modern transport systems and to realise the country's economic growth potential (McCaul 2003). They are fundamentally a central place of economic and cultural interchange; an important source of employment, and an influential factor in regional and national development (Hoyle 1983). Moreover, seaports both technologically and economically are a node for contacts and contracts, whereby every stakeholder is driven by his own interests and priorities (Notteboom & Winkelmans 2002).

Seaports are becoming increasingly regional in their dynamics, which represents a new transition from their traditional local functions (Park 2003). Furthermore, seaports, as an element in a value-driven chain, are 'functional elements embedded in logistics pathways—sequences of logistics functions which may include shipping operations, stevedoring, warehousing and depot operations, trucking and rail hauls and related functions like freight forwarding' (Robinson 2003, p. 655). Consequently, the idea of seaports as logistic systems has notably been elaborated by Paixao and Marlow (2003, p. 358) as they suggest:

Traditionally, ports have been defined as areas made up of infra and superstructures capable of receiving ships and other modes of transport, handling their cargo from ship to shore and vice-versa and capable of providing logistics services that create value-added...However, from logistics point of view, ports are logistics systems along the supply chain which have to respond to pull logistics; their action will contribute towards the reduction of inventory levels along the logistics pipeline, a fall in associated costs, and the fulfilment of tighter customers' requirements through high service levels within shorter lead-time.

Thus, for providing efficient, low cost, intermodal and intramodal transfer, inspection, storage, and control of cargo, a seaport must be able to accommodate ships and vehicles of other modes interfacing at the port. It should act as an integral part of a chain of transport links designed to move cargoes from place of low utility to a place of high utility—right place in right time with right technology at right cost (Quality Quest 2004). A wider definition of the role of seaports is provided by the following quotation from an alderman for the port of Antwerp (as cited in Branch 1986, p. 2):

The task of promoting the interests of the port knows almost no limitation in time or space. Its aim is to serve the prosperity and welfare of our regional or national community and beyond our borders to make a contribution to improving the quality of life.

In the previous sections it was made clear that strong links exist between transport and development. Therefore, it can effortlessly be deduced that seaports, as a constituent of transport chain, have positive effects on development, and are cause and a result of development (Hilling & Hoyle 1984).

From the trade point of view, globalisation of trade and development of larger trade areas have led to shipping and intermodal alliances to handle the global nature of the transport supply chain. Similarly, seaport terminal operators have kept pace, globalising operations to offer their shipping customers consistent services over diverse trade routes (Juhel 2001). Consequently, as a result of considerable augmentation in the level of competition in international trade and the globalisation of maritime industry, the volume of sea trade has increased dramatically (particularly during last three decades). These challenges (i.e. continuous progress of globalisation and trade business) facing the world's seaports are not only related to the quantity but also the quality. That is, seaports are aggressively required to play a more active role in the integration of logistics, and are expected to be not just a transferring point between different modes but also an integrated logistic centre in the seamless transport chain (Inoue 2002). On the important role seaports play in conjunction with globalisation and trade growth, Inoue (2002, p. 5) reminds us the motto of International Association of Ports and Harbours (IAPH) as 'World peace through world trade - World trade through world ports', and further states:

To cope with such an ever growing world trade, ports of every country will no doubt continue to play a critical and indispensable role. In his keynote address at the IAPH's World Port Conference in Kuala Lumpur in May 1999, Dr. Mahathir, Prime Minister, Malaysia, clearly stated, "no matter how information technology advances, the world trade cannot be materialised without ports. This is exactly why every country needs to develop much more advanced and efficient ports for its prosperity".

Therefore, modern and efficient seaports, as an eminent and fundamental ingredient of the inclusive pattern of trade and transport, are necessary and powerful tools for

facilitating and fostering trade and development and more so at a time of globalisation of trade. In this regard UNCTAD (1992a, p. 2) declares that:

The need to develop foreign trade and contribute to national economic growth places a heavy burden of responsibility on the ports of all countries and especially the ports of many developing countries...There is no known developing country that has recorded substantial economic growth without a sustained increase in its foreign trade, based on efficient ports.

Form the economy point of view, seaports used to be (and they often still are) regarded primarily as the driving force behind the economy (Suykens & Van De Voorde 1998). In fact, they are a significant contributor to national economic development (Robinson 2002)—both by facilitating trade through the port and providing vital transport infrastructure that acts as a catalyst to support investment and growth in the region. They are also compulsory transit points for the bulk of the trade, permitting the import of goods that the country does not itself produce in sufficient quantity, and the export of its major items. This contributes heavily towards the development of national economy. Further on the economic impacts of seaports improvement, Goss (1990a, p. 211) suggests that:

The economic function of an improvement in a seaport is to increase the producers' surplus of those who originate the exports passing out through it; and to increase the consumers' surplus of those who ultimately consume the imports passing in through it. It follows that a measure of economic efficiency of a port is the aggregate cost of passing cargo through it.

Benacchio, Ferrari, Haralambides and Musso (2000) analyse the importance of assessing port impacts on regional economies and suggest that the emphasis on seaports benefits can be considered as the driving force for a sound economic justification of explanatory goals for port activities. They further believe that national and local governments, port authorities and port business communities always stress that the development of ports could be a key factor in the economic development of local economies. From a national perspective, ports play an important role due to the fact that they generate taxes and duties and they often constitute growth poles for national industries (i.e. manufacturing, transport, logistics, etc.) and services, improving their competitiveness. Collectively, it can be alleged that improving the performance of a port system expands the country's international market access and leads directly to increased trade and, through this, to higher income (Park & De 2004). Furthermore, port

management activities are also centred around and directed towards achieving these economic goals. Therefore, for this very reason, port management could be implicitly characterised by a double aim (Benacchio et al. 2000):

- make the seaport attractive to users, providing a competitive supply of services for carriers and shippers (micro-economic or entrepreneurial); and
- raising the welfare of its citizens, enhancing social welfare in terms of income, employment, living environment, security and other aspects (macro-economic or social aim).

Seaport and maritime related economic impact studies have become increasingly important as they measure the direct (primary) and indirect (secondary) impact on patterns of jobs, incomes and tax revenues in the local economy. These impacts become even more important because they can serve as an important educational tool to the community in understanding the structure of seaport and seaport dependent industries as well as its immediate economic effects. One of the most common approaches to assess seaport economic impact is the one based on an input-output analysis (Warf & Cox 1989; Musso, Benacchio & Ferrari 2000).

As outlined, in addition to keeping a nation's goods on the move, seaports also help keep nation's economy on the move through employment. Among the jobs which directly depend on ports are: terminal workers, longshoremen, pilots, forwarders, brokers, ship agents and lines, ship crews, warehousing and transloading employees, container repair and leasing companies, chandlers, ship repair and marine construction businesses, barge operators, and local government. To quantify the impact of seaports' employment on the national economy, it is worth citing that in United States almost 16 million Americans work in port-related jobs—jobs that mean \$515 billion in annual income and \$210 billion in federal, state and local taxes, and seaport activities contribute more than \$780 billion to GDP (Newman & Walder 2003; AAPA 2004).

An efficient transport system is also a prerequisite to attract foreign investments. Seaports, through provision of efficient and reliable services allowing the timely flow of goods, can be a crucial element in developing a competitive advantage for a country,

and therefore governments and port authorities need to adopt suitable policies to allow the nations to reap this immense potential benefit (Juhel 2001).

Notwithstanding all the positive economic impacts of seaports and seaport improvement through an appropriate port development plan, Goss (1990a) is not optimistic and provides four clear reasons for which seaport improvement is unlikely to be an efficient tool of economic development strategy:

- seaport benefits are likely to leak to users in inland locations;
- assisting and investing public money in a seaport will probably mean assisting foreign exporters, some of whom will be able to compete more effectively with home producers;
- any public assistance to a seaport is likely to lead to higher local taxes, running the risk to make the area less attractive to residents and possible businesses too; and
- since the aggregate demand for labour within any given economy is determined by macroeconomics factors, seaports are competing among themselves for a share of a reasonably fixed level of business.

## **6. Iran's Maritime Capacities and Their National Impacts: An Overview**

The history of maritime transportation in Islamic Republic of Iran (Iran hereafter) dates back to ancient times and has its roots in the religion and national traditions. It has been cited in ancient books that the banks of the Persian Gulf had been the home to early human beings and that they went boating for the first time in this sea. Valada (as quoted in Payame-e Darya 2001, p. 37) writes about primitive man and his boating:

As it is known, the history of human beings has started from the west bank of the Persian Gulf. Therefore, the Persian Gulf was the first sea sailed by the people aboard small boats. At any rate, the first group of people in the old ages, i.e. Phoenicians, Babylonians, Chaldeans, Sumerians, and then Greeks, Iranians and Arabs sailed in the Persian Gulf waters.

Access to waterways from three directions—Persian Gulf (Southwest), Oman Sea (South) and Caspian Sea (North), makes Iran a unique and strategically important country in the region in terms of cargo transit (through East-West and North-South

corridors), the country's imports and exports, and carriage of goods and passengers by ships.

With an area of 1,648 thousand square kilometres, Iran is located in south-western Asia (Middle East) and shares its entire northern border with former Soviet Union countries—Armenia, Azerbaijan and Turkmenistan Republic (a total of 1740 km, excluding 630 km of coastline of the Caspian Sea). Iraq with 1280 km and Turkey with 470 km border neighbour Iran in the west. Afghanistan and Pakistan also share 1680 km borders with Iran in the east (Figure 2.14).

This special geographical position of Iran and its location on international trade routes half way between the East and the West, and the North and the South promises a suitable market for providing transport services to international trade. Policy-makers also consider Iran's international connections to be critical to its economic future as it strives to improve trade with neighbouring countries.

## 6.1. Iran's Seaports System

Iran's coastline include a 630 km long strip by the Caspian Sea in the north and about a 1880 km long coastal strip in the Persian Gulf in the south, extending from the Arvand river by the Iraqi border all the way to the Indian Ocean via the Oman Sea. This gives Iran about an overall 2500 km of strategically significant coast line with unique natural features. Iran's long maritime border in the Persian Gulf is of major significance to the country's trading status, and categorises Iran as one of the focal maritime nations in the region (Eqtesad-e Iran 2001).

This 2500 km coastal border in the North and South links the country to the world by six major ports (Figure 2.14), nine multipurpose ports<sup>1</sup> and over 100 minor ports<sup>2</sup>. The Iran's network of major commercial ports includes: three in Persian Gulf—Bandar Imam Khomeini (BIK), Bandar Abbas (Shahid Rajaie and Shahid Bahonar complexes)

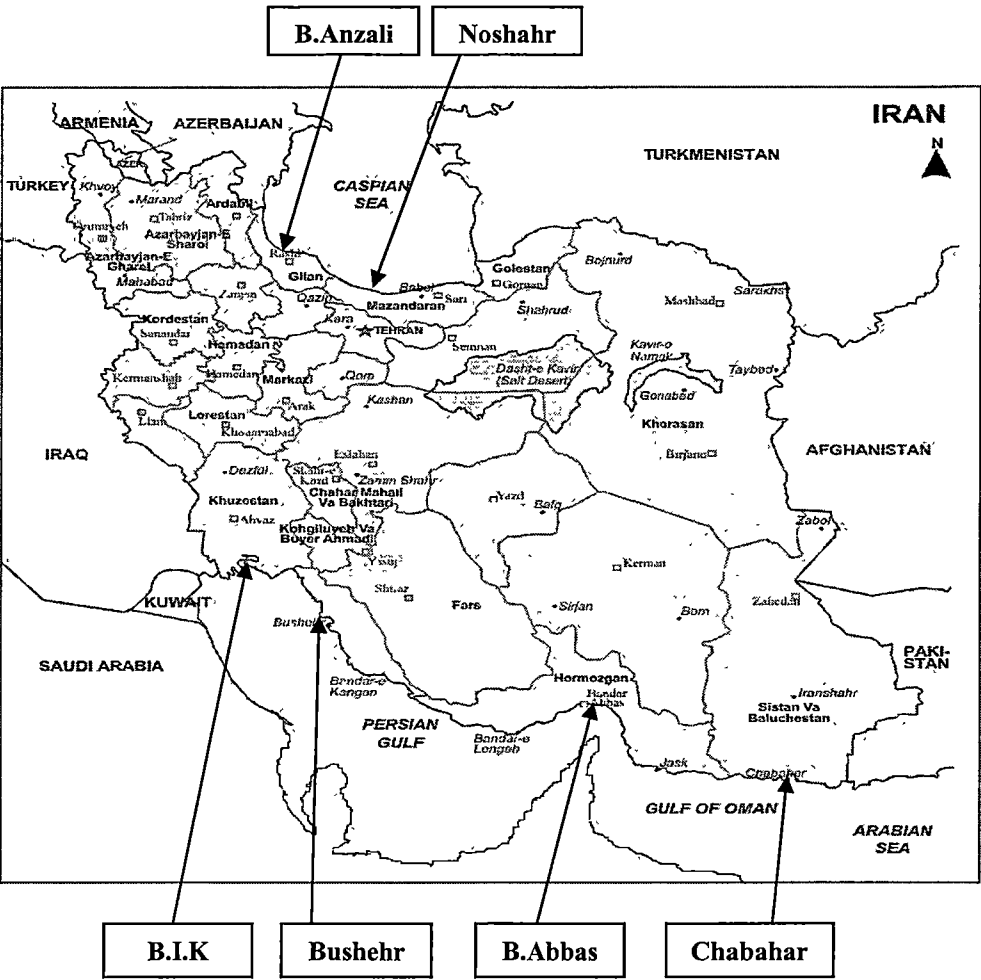
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<sup>1</sup> Multipurpose ports, which are mainly located along the southern coastline and operate in regional scale, include Abadan, Khoramshahr, Lengeh, Jask, Qeshm, Genaveh, Daylam, Hormoz, Khazar (Amirabad), and Shahid Kalantari (Chabahar). The tonnage they handle is small in comparison with major ports.

<sup>2</sup> These are also on the entire southern coastline with open beaches and berthing facilities only for small cargo and fishing vessels (primitive and traditional wooden dhows) and boats that are engaged in near coastal voyages. The tonnage they handle is negligible.

and Bushehr; two in Caspian Sea—Anzali and Noshahr; and one in Gulf of Oman—Chabahar. Table 2.8 shows the type, number and length of berths in each of these major ports while Table 2.9 illustrates the capacity of major port with reference to different types of cargo in year 2002-2003<sup>3</sup>.

Figure 2.14: Islamic Republic of Iran (IRI)—Major Seaports



In 2003-2004, the volume of imports and exports of goods by all modes of transportation was well above 45.5 million tonnes, and export of crude oil was about 2.5 million barrels per day (SCI 2004). Figure 2.15 illustrates the trend of import and export of cargo over the past five years. During this period, the total share of major commercial ports in imports was 96.4%, while the share for exports was 86.8% (INSTC 2003).

<sup>3</sup> Iranian years start on 21<sup>st</sup> March and end on 20<sup>th</sup> March of the following year. All annual statistics refer to these time periods.

Table 2.8: Features of Iran's Major Commercial Ports, 2002-2003

PORT		General Cargo			Container			Bulk			Total	
		No.	L* (m)	D# (m)	No.	L (m)	D (m)	No.	L (m)	D (m)	No.	L (m)
Imam Khomeini		21	3498.5	10-13	5	1037	10-15	11	2273.5	10-13.5	37	6809
Bandar Abbas	Shahih Rajaie	15	2860	11-12	5	1000	12.6	4	770	13.5	24	4630
	Shahid Bahonar	7	950	6-10	0	0	-	0	0	-	7	950
Bushehr		4	893	3.5-8.5	0	0	-	2	0	4.5-8.5	6	893
Chabahar		4	600	8-9	0	0	-	0	0	-	4	600
Anzali		10	1521	5.5	0	0	-	0	0	-	10	1521
Noshahr		5	700	4-5	0	0	-	1	100	4	6	800
Total		66	11022.5	-	10	2037	-	18	3143.5	-	94	16203

Source: Derived from Iran's Port and Shipping Organisation (PSO) data (2003)

\*Length of berths #Draft (Permissible)

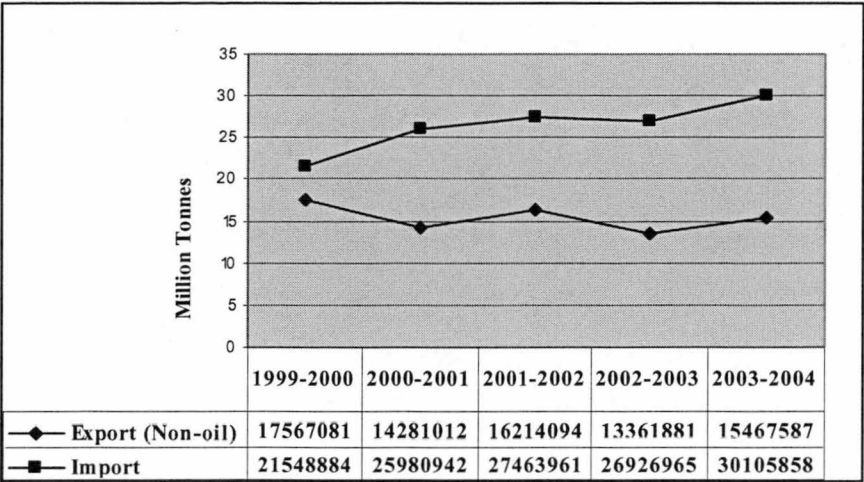
Table 2.9: Capacity of Iran's Major Commercial Ports, 2002-2003 (Thousand Tons)

		Bulk	Mineral	Chemical	Iron	Bag	General	Container	Liq.	Oil	Tot. Non-oil	Total
Imam Khomeini		12456	4816	5721	2630	1831	1298	290	488	15062	29530	44592
Bandar Abbas	Shahih Rajaie	4014	3094	3182	853	898	874	5908	1057	23782	19879	43661
	Shahid Bahonar	0	162	72	0	157	1159	0	0	1128	1550	2679
Bushehr		0	0	193	0	431	540	0	0	1459	1164	2622
Chabahar		744	0	0	0	513	27	0	0	1161	1284	2446
Anzali		0	102	89	1192	0	85	0	0	1169	1467	2637
Noshahr		138	0	49	576	0	204	0	0	664	967	1631
Minor Ports		0	0	0	0	0	3088	0	0	0	3088	3088
Total		17352	8174	9306	5251	3830	7275	6198	1545	44425	58929	103356

Source: Derived from Iran's Port and Shipping Organisation (PSO) data (2003)



**Figure 2.15: Total volume of Imports and Exports (non-oil) during the past 5 years (tonnes)—all modes**



Source: Created with data from SCI (2004)

The maritime trading significance of a country can be envisaged by the number of ships calling at its seaports every year. Reviewing the statistics reveals that the number of ship calls at Iran’s major ports has been tripled over the last decade. Interestingly, the northern ports (Anzali and Noshahr) have grown considerably in recent years due to their contribution to the international North-South transit corridor.

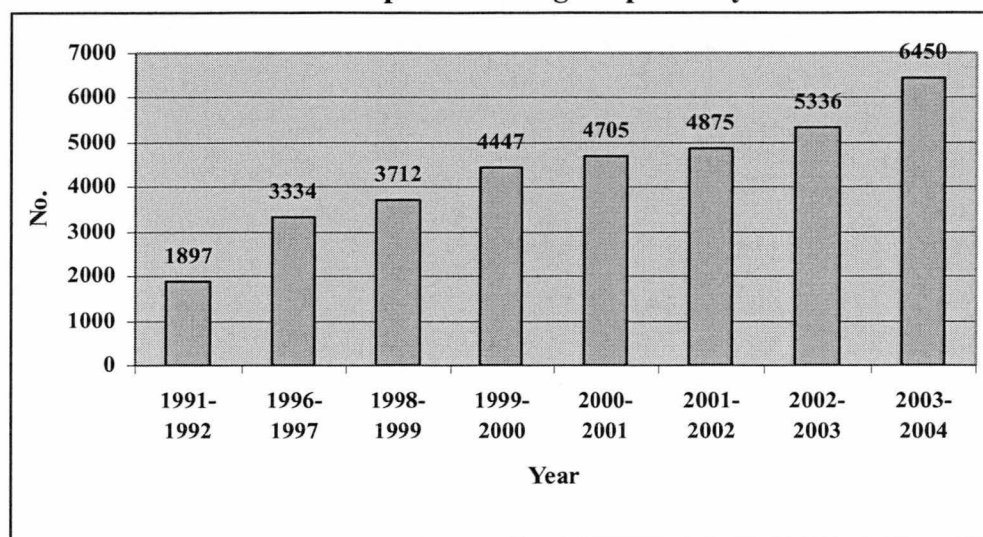
Table 2.10 and Figure 2.16 demonstrate and compare the total number of ships which called at major Iranian seaports while Figure 2.17 shows the percentage share of major ports’ ship calls in 2003-2004. As can be noted from Figure 2.17, the southern ports of Iran (in Persian Gulf) have attracted 60% and northern ports (in Caspian Sea) accommodated 40% of ships which called at Iran’s major seaports.

**Table 2.10: Number of ship calls at major commercial ports during the past 14 years**

Ports Year	Southern Ports				Northern Ports		Total
	B.I.K.	B. Abbas	Bushehr	Chabahar	Anzali	Noshahr	
91-92	544	609	152	60	349	183	1897
96-97	675	1325	148	51	690	445	3334
98-99	922	1715	133	34	520	388	3712
99-00	1092	2177	230	59	392	497	4447
00-01	1055	2059	180	39	759	613	4705
01-02	1092	2201	161	50	989	597	4875
02-03	1200	2244	291	43	821	737	5336
03-04	1199	2204	400	52	1224	1371	6450

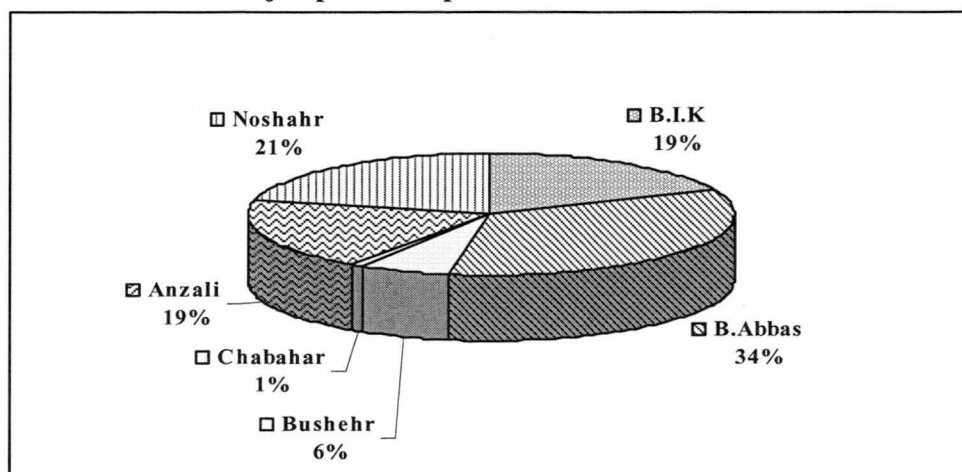
Source: Derived from SCI (2004); PSO annual report, various years

**Figure 2.16: Total number of ship calls during the past 14 years**



Source: Created with data from SCI (2004); PSO annual report, various years

**Figure 2.17: Share of major ports' ship calls in 2003-2004**



Source: Created with data from SCI (2004); PSO annual report, various years

Iran is one of the major oil producing countries (ranked 2<sup>nd</sup> by OPEC) and its economy relies heavily on oil export revenues. Its rich reserves of hydrocarbons<sup>4</sup> as well as other natural resources, alongside the country's geo-strategic position make it a unique economy. Strong oil prices in the past couple of years have helped Iran's economic and budgetary situations greatly. In 2003, Iran's real GDP grew by around 5%; in 2004-2005 it is expected to grow at around 4.5%-5.5% annually (EIA 2004).

Despite all these facts, Iran as a developing country (as discussed earlier) is profoundly dependent on international trade, and expansion of trade is a necessity for its economic growth. Therefore, from a commercial point of view, the existence and operationality of Iran's seaports are vital to the flow of trade in terms of both imports and exports. To understand the intensity of Iran's seaports engagement and their contribution to trade, Tables 2.11 and 2.12, and Figures 2.18 and 2.19 depict the total volume of cargo (oil and non-oil) that has been handled in Iran's commercial seaports during the past 5 years.

These figures (in Table 2.11) confirm that port throughput has increased sharply during the past 5 years. Seaports have handled about 37 million tonnes of non-oil cargo in the year 2002-2003, a growth of 165% over 1998-1999's figure. Comparing the figures in Table 2.11 against those of Figure 2.15 (total imports and exports), gives an average of 90% contribution of seaports to imports and exports of non-oil products by weight. In terms of oil product, Iran's seaports also handled about 40 million tonnes in year 2002-2003 (Table 2.12).

Furthermore, an inference that can be made from these tables is the distinction between seaports located in the Persian Gulf and those situated in the Caspian Sea. The southern ports contribute 94% and 90% of total non-oil and oil cargo throughput respectively, while northern ports' shares are only 6% and 10%.

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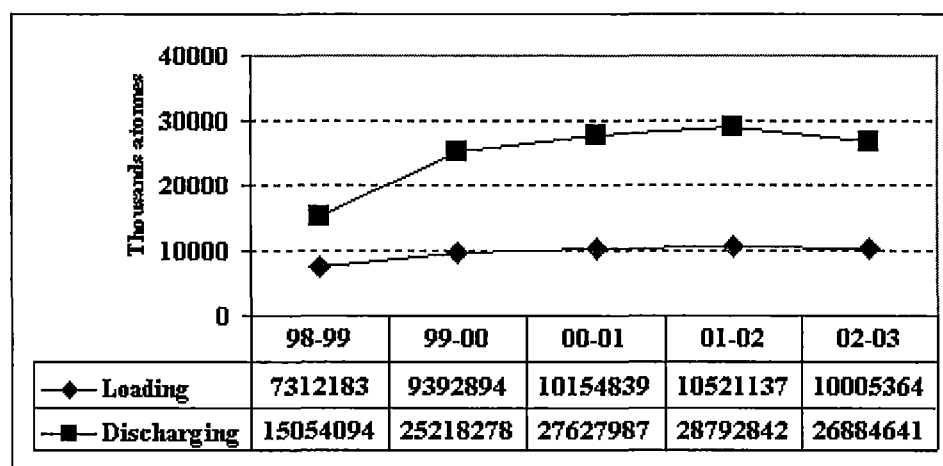
<sup>4</sup> Iran possesses the 2<sup>nd</sup> largest gas reserves and the 4<sup>th</sup> largest oil reserves in the world.

Table 2.11: Volume of cargo handling (Non-Oil) in ports during last 5 years (tons)

	BIK		Bandar Abbas		Bushehr		Chabahar		Anzali		Noshahr		Minor Ports		Total	
	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge
98-99	3984142	6471367	1629128	6563100	332800	275566	0	267518	89356	745878	14210	321982	1262547	408683	7312183	15054094
99-00	4505207	11294531	2775293	10607600	290624	435826	103	499520	98423	964578	37178	736224	1686066	679999	9392894	25218278
00-01	4590221	12298784	3627819	10660961	202645	291973	0	416897	122241	1929917	35267	1057796	1576646	971659	10154839	27627987
01-02	4794195	12036862	3811595	10863772	220465	351512	62633	475771	76339	2580406	46980	1272529	1508930	1211990	10521137	28792842
02-03	398644	10971399	3744039	9676488	244962	425982	21461	328545	104591	2422597	38418	1194093	1865049	1865537	10005364	26884641

Source: Derived from SCI (2004); PSO annual report, various years

Figure 2.18: Trend of loading and discharging of non-oil cargo in major ports of Iran during the past 5 years



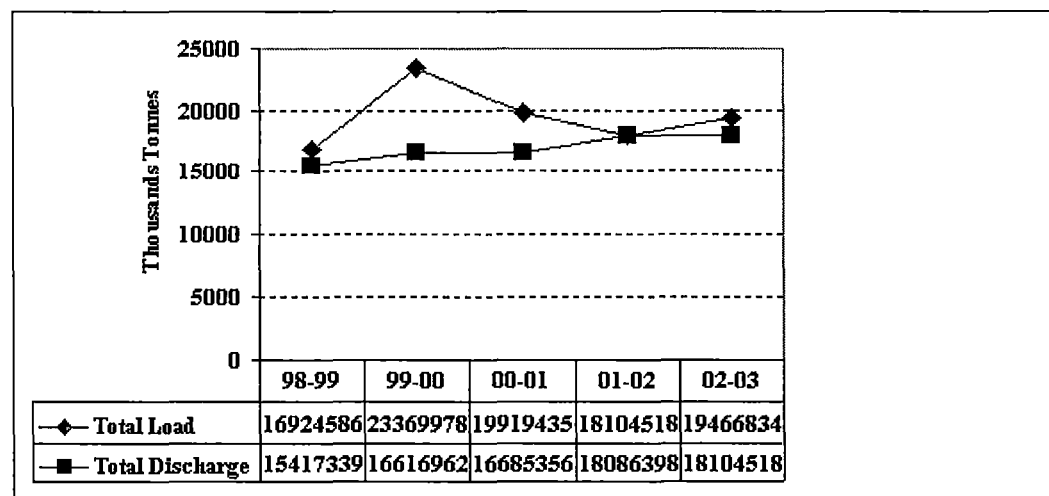
Source: Created based on data from SCI (2004); PSO annual report, various years

Table 2.12: Volume of cargo handling (Oil) in ports during last 5 years (tons)

	BIK (Inc. Mahshahr)		Bandar Abbas		Bushehr		Chabahar		Anzali		Noshahr		Minor Ports		Total	
	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge	Load	Discharge
98-99	11471795	384951	5047194	11555141	105825	888445	0	405698	0	825055	0	53740	299772	823309	16924586	15417339
99-00	14663123	444865	7804387	13416180	511198	974893	0	459681	0	80636	0	183651	7841291	1057056	23369978	16616962
00-01	12388101	398011	7160002	13217510	202132	1170328	0	445171	0	52945	0	897254	169200	504137	19919435	16685356
01-02	11252358	814820	6616575	14580682	101916	1198114	0	481548	6	28	0	121767	133663	889439	18104518	18086398
02-03	11530114	974278	7356210	15034581	317896	1185074	0	512827	0	22	0	121767	262614	1534036	19466834	18104518

Source: Derived from SCI (2004); PSO annual report, various years

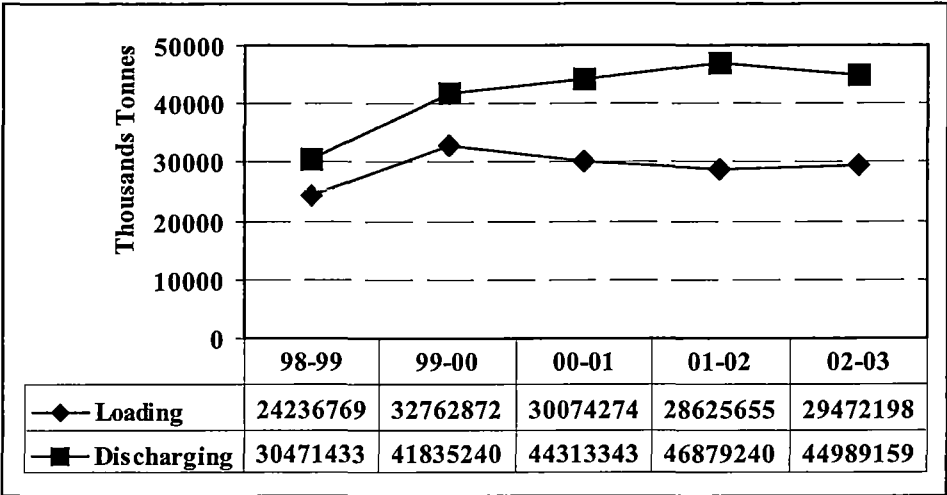
Figure 2.19: Trend of loading and discharging of oil cargo in major ports of Iran during the past 5 years



Source: Created based on data from SCI (2004); PSO annual report, various years

In addition, Figure 2.20 compares total loading against total discharging values of Iran’s seaports during the last five years, which is a good indication of the country’s higher import rate than export rate.

**Figure 2.20: Total loading and discharging (oil and non-oil) of Iran’s ports during the past 5 years**



Source: Created based on data from data from SCI (2004); PSO annual report, various years

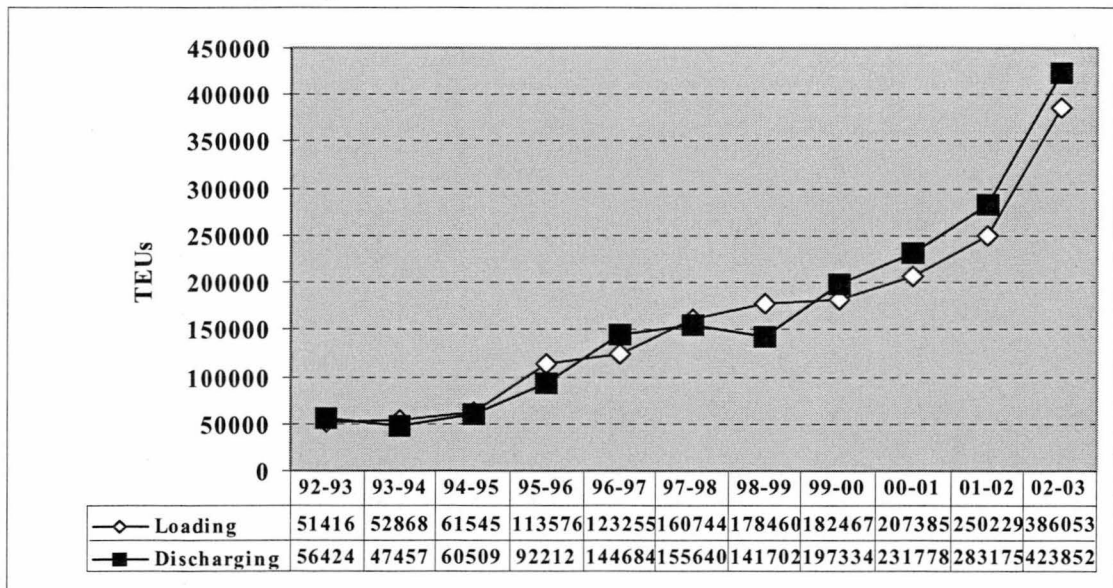
As previously discussed, containerisation has revolutionised the concept of port operation over time. As a result of containerisation, some ports were prompted to develop into hub ports to provide more services and secure higher profit, and thus take advantage of increasing returns to scale. Port competition has also fiercely intensified under containerisation. Therefore, ports were obliged to enter the container industry by improving infrastructure to reduce the time and cost of ship calls, and to secure a competitive advantage. Unfortunately, the share of Iran’s seaports in container handling compared with many countries has been negligible. Table 2.13 tabulates Iran’s major ports container throughput in the last decade, and indicates that Iran’s ports have handled only 809905 TEU in year 2002-2003; about 1% of the world seaborne container trade (75.8 million TEU).

**Table 2.13: Container handling during the past decade (TEUs)**

	Loading	Discharging	Total
92-93	51416	56424	107840
93-94	52868	47457	100325
94-95	61545	60509	122054
95-96	113576	92212	205788
96-97	123255	144684	267939
97-98	160744	155640	316384
98-99	178460	141702	310162
99-00	182467	197334	379801
00-01	207385	231778	439163
01-02	250229	283175	533404
02-03	386053	423852	809905

Source: Derived from PSO annual report, various years

Figure 2.21 also shows the growth of container handling and compares them in terms of loading and discharging over the past decade. As can be seen, a growth rate of 650% has been achieved over a 10-year period, which is positive sign of the country's desire to attain higher objectives in terms of container throughput.

**Figure 2.21: Trend of container handling (loading and discharging) in major ports during the past decade**

Source: Created based on data from PSO annual report, various years

This sharp rise of container handling, particularly after 1999-2000, is mainly due to the creation of the International North-South Transit Corridor (INSTC) linking South Asia (Indian Subcontinent) to central Asia and North Europe via Iran. This route was

established in 1999-2000 through an agreement between Iran, Russia and India. The INSTC stretches from ports in India across the Arabian Sea to the southern Iranian ports (through Bandar Abbas and BIK), where goods then transit Iran and the Caspian Sea (through Anzali and Noshahr) to ports in Russia's sector of the Caspian. From there, the corridor extends along the Volga River via Moscow to Northern Europe. In fact, this corridor is an alternative to the route linking South Asia to Europe (East-West corridor) through the Indian Ocean, Red Sea and Suez Canal and then into the Mediterranean, Atlantic and North Sea to Baltic ports. The alternative route is expected to offer a quicker and cheaper option than the above-mentioned route. The delivery time using INSTC is predicted to reduce by a minimum of 10 days (one-third), and the container transportation costs to be decreased by \$400-\$500 (almost by 30%) (Spector 2002).

As is apparent, Iran, because of its strategic geographical location at the heart of the North-South corridor, was supposed to play a special role in serving transit cargo flows from Asia to Europe and back, as well as to the countries of the Persian Gulf and Central Asia. This opportunity has inspired the policy-makers to consider transit as a replacement for oil revenues. Shorter distance and time of travel between the points of origin and destination are among the factors allowing Iran to enjoy comparative and competitive advantages in the region for transit of goods through the North-South corridor. Based on this realisation, Iran is endeavouring to turn itself into a major Asia-Europe transit route by full exploitation of its geographical location thus providing a major source of income, employment, economic and political influence (Peimani 2003).

Some 500 million tonnes of goods transit between the East and the West on a yearly basis, and the trade between Asia and Europe amounts to billions of dollars per year. According to Iran's Customs (2003) statistics, during the year 2002-2003 more than 4.3 million tonnes of goods with the value of \$7.8 billion transited through the territory of Iran. A comparison between these figures and those of the same period for 2001-2002 (2.4 million tonnes and \$7.4 billion respectively) reveals a growth rate of 77.26% in the weight but only 5% in the value of transit goods. It is predicted that if Iran manages to secure a 10% share of the transit trade, it will win a huge income in foreign exchange (more than oil exchange revenues), which will breathe new life to the Iranian economy (Iran International 2003).



The above facts and figures (export, import, port throughput, container throughput and transit) attest to the important role seaports play and their impacts on the economy of the country. As indicated, Iran's seaports are fully devoted to the country's international trade and continue to improve their operations and services towards self-sufficiency.

## 6.2. Iran's Merchant Marine

The history of Iran's national fleet dates back to the 1950s when the increase in the volume of trade of the country led to the establishment of state owned shipping lines. Today, after almost fifty years and by any standard of measurement, Iran has the biggest merchant fleet in the Middle East and is ranked 18<sup>th</sup> in the world (Lloyd's Register Fairplay 2003). As at July 2004, Iran's owned merchant marine fleet reached 140 ships (ships of 1000 GT and above) with a DWT of 8.4 million tonnes—a share of 1% in the global market. These ships are owned by two major national companies; namely the Islamic Republic of Iran Shipping Line (IRISL) and National Iranian Tanker Company (NITC).

IRISL is a national shipping company operating as an affiliate of Iran's Ministry of Commerce. As of July 2005, the company's commercial fleet comprises a total of 115 ocean-going cargo ships with the capacity of 3.7 million DWT (IRISL 2005). Around 50% of the country's exports and 40% of Iranian imports are handled by IRISL.

NITC is a national tanker company, a prominent company among OPEC members, operating as an affiliate of Iran's Ministry of Oil. The company's fleet, as of July 2005, consists of 28 vessels with an approximate total capacity of 5.1 million DWT tonnes (NITC 2005).

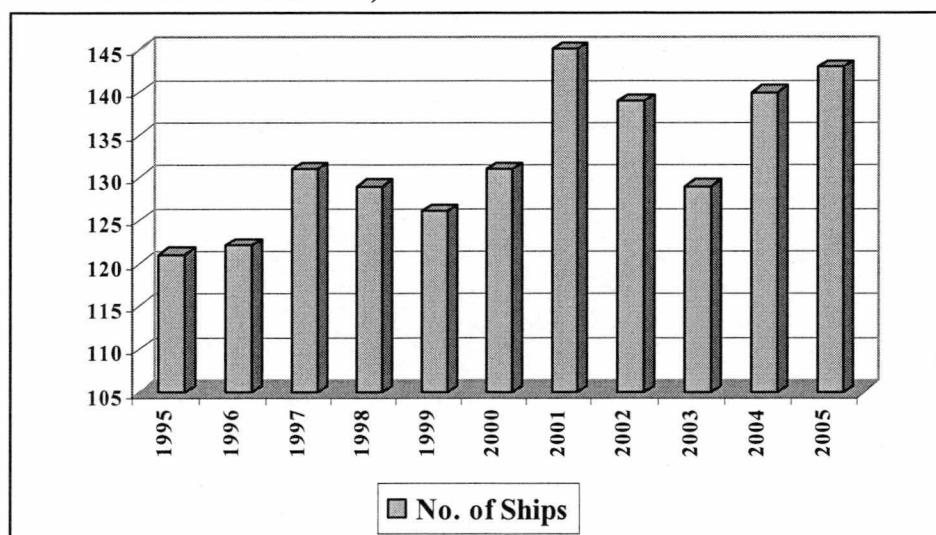
The total number of Iranian flag ships, their deadweight capacity and ranking among Asian countries is quite significant (Table 2.14). The trend of fleet ownership and development of their capacity are shown in Figures 2.22 and 2.23. By comparing these two figures, it is noted that although the number of nationally owned ships has been fluctuating, the deadweight capacity has risen sharply in recent years, and in July 2005 it's reached its highest of all time.

**Table 2.14: Development of Iran's National Commercial Fleet (all types), 1995-2005 (Ships of 1000 GT and Over)**

Year	No. of Ships	dwt (1000)	dwt-rank (Asia)
1995	121	5757	10
1996	122	4577	11
1997	131	6278	10
1998	129	6209	10
1999	126	5654	11
2000	131	6050	11
2001	145	7087	10
2002	139	6221	11
2003	129	7027	10
2004	140	8400	N/A
2005	143	8800	N/A

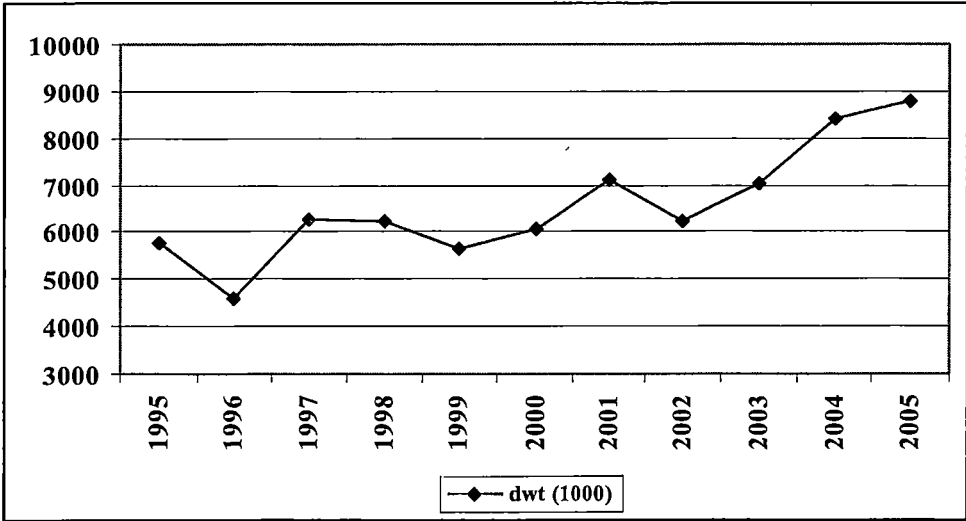
Source: Derived from ISL (1995-2003); IRISL (2005); NITC (2005)

**Figure 2.22: Trend of Iran's Fleet Ownership (all types) in the Last Decade (Ships of 1000 GT and over)**



Source: Created based on data from ISL (1994-2003); IRISL (2005); NITC (2005)

**Figure 2.23: Development of Iran’s National Fleet Capacity in the Last Decade  
(Ships of 1000 GT and Over)**



Source: Created based on data from ISL (1994-2003); IRISL (2005); NITC (2005)

## 7. Summary

The main objective of this chapter was to present some background information regarding the important roles that transportation in general and maritime transport in particular play in the development of nations (i.e. economic, social, political, etc.). Therefore, the chapter followed a logical sequence of general to particular; starting from an abstract notion of transportation impacts on development, with particular reference to developing countries, that was narrowed down to the maritime mode of transport, and eventually to seaports, as key elements of maritime transport. Finally, the chapter presented an overview of Iran’s maritime capacity in terms of seaports and merchant marine.

Transport can be seen as both the cause and the effect of development. In other words, it is a result of a nation’s growth as well as a cause for growth. Thus, the transport-development relationship is a two-way interactive process. There are many factors involved in this complex relationship and the transport system of a country or area cannot be explained by one factor alone, but rather by a series of interrelated factors such as economy, trade, technology, population, etc.

Transport has proven vital in expanding international trade and generating economic development and there is a firmly held belief among policy-makers that transport, transport investment, and transport improvement hold the promise of economic development. Thus, the impacts of transport on economic development can be assessed from different dimensions; namely, increase in production, growth of the demand, reduction of costs, and expansion of infrastructure.

As far as the social aspects of transport are concerned, transport should not be looked at solely as a means for servicing trade but also as a means to meet human mobility needs. Transport is desired to increase accessibility and to permit people to live and work in different places. Accordingly, increasing the access to and from different regions improves social cohesion. Without transport, social relationships and contacts are limited. Finally, poverty reduction through economic development is a crucially important social aspect of transportation.

Politically, transport has always served a political role in the world and governments have used it as a tool to achieve their long-term goals. Additionally, the ownership and operation of modern transport infrastructure may be treated as a symbol of power, status, and pride by governments.

In the context of developing countries, despite the expenditure on transport frequently being the largest single item in their national budget, the cost of transporting goods to and from these countries is normally higher than developed economies. Inadequate or deficient transport infrastructure, poorly managed and maintained transport services, ineffective logistic systems and distribution strategies are the major drivers of higher costs of transportation in these nations. Therefore, improving the capacity and standards of maintenance of existing infrastructure, investing in new transport infrastructure, and managing the transport services more effectively will contribute to lowering the transport costs and ultimately to the overall economic performance of developing countries.

Maritime transport, which is accountable for over 90 percent of all international trade by volume, is the oldest and the most cost-effective way of moving goods. Despite the innovations that have transformed all modes of transportation, ships still remain the

most economical means of moving large quantities of goods from one place to another. Furthermore, low maritime transport costs due to competition and technological advancement in the maritime industry have made ocean transportation a facilitator of world trade, growth and prosperity. Consequently, the demand for maritime transport initiates a chain of economic activity, which contributes greatly to international trade and overall national and international economy.

Traditionally, seaports were viewed as a terminal where shipments originated and terminated their journey. However, at present seaports are considered as a link in the transport chain providing an interface between transportation modes, and main gateways for international trade, linking national supply chains to the global marketplace, as well as maintaining trade flows. More importantly, seaports are a significant contributor to national economic development; both by facilitating trade through the seaport and providing vital transport infrastructure that acts as a catalyst to support investment and growth in the region. Therefore, the development of seaports is a key factor in economic development. Improving their performance could expand the country's international market access and lead directly to increased trade and, through this, to higher income. Moreover, seaports also play a major role in industrial plant location, contribute to the economy through employment, and are counted as one of the major sources of attracting foreign investments through the provision of efficient and reliable services allowing the timely flow of goods and thus developing a competitive advantage for a country.

Iran's rich reserves of oil as well as other natural resources along with the country's geo-strategic position make it a unique economy. In addition, access to waterways from three directions makes Iran a unique and strategically important country in the region in terms of international cargo transit, the country's imports and exports, and carriage of goods and passenger by ships. However, the country, like all other developing countries, is dependent on international trade, and expansion of this trade is a necessity for its economic growth. Therefore, from a commercial point of view, the existence and operations of Iran's seaports are vital to the flow of trade in terms of imports, exports, and international transit. In other words, the importance of seaports and their effectiveness is crucial to the development of Iran's transport systems and the country as a whole.

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The following chapter discusses the port management practices. In doing so, it looks at different traditional and contemporary types of seaport ownerships and administrations. It then describes the method of organisation of seaports in Iran.

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# Chapter 3

## Seaports Organisations

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### 1. Introduction

There are as many definitions of organisation as there are books written about it, but all convey the same meaning. For example, Bartol, Tein, Matthews and Martin (2003, p. 5) claim that organisations are an important part of our daily lives, and define them as ‘two or more persons engaged in a systematic effort to produce goods or services’. They further define management as ‘the achievement of organisational goals by engaging in the four functions of planning, organising, leading and controlling’. Or, Robbins (1990, p. 4) defines organisation as ‘a consciously coordinated social entity, with a relatively identifiable boundary, that functions on a relatively continuous basis to achieve a common goal or set of goals’. These definitions reveal that an organisation comprises management (consciously coordinated), people or groups of people (social entity), specified and defined functions (identified boundary), continuing bond (continuous basis), and finally certain objectives (goals).

The main underlying characteristic of organisations is their goal-oriented nature. Organisations are designed for a purpose and the behaviour within and between organisations reflect that purpose (Brown & Moberg 1980; Dawson 1986). The objectiveness allows organisations to continue their existence and operations even though the top managers and key personnel may change over time. Goal achievement induces fundamental characteristics of organisations such as organisation technology (specialisation), organisation structure and design (organisation theory), organisation environment (internal and external), and interfaces of all these characteristics (Smith, Carrol, Kefalas & Watson 1980; Brown & Moberg 1980; Bolman & Deal 1991; Schlesinger, Sathe, Schlesinger & Kotter 1992).

Global trade is a dynamic entity. It is incessantly evolving and changing with new technology, changing philosophies, and political pressures all acting to keep it in a state of flux. Dynamic organisations, engaged in world commerce, need continuous evolution of all their components and characteristics. They need to introduce a change strategy to secure the efficiency and effectiveness of the organisation's operation and output if they are to survive. This is particularly true of seaport organisations whose very existence is predicated upon global commerce and the movement of goods (Hartung 2001).

This chapter is the logical extension of the preceding chapter in that it provides further background information on seaports but from a more managerial perspective by describing different types of seaports, and portraying different types of seaport ownership, administration, and organisation as being exercised around the world. It then describes the functions, policies, and structure of the organisation in charge of Iran's seaports. Finally, the chapter outlines current practices and methods of organisation of seaports in Iran, thus providing the context for the review of organisational effectiveness.

## **2. Different Classifications of Seaports**

Reviewing the contemporary history of port management development reveals that seaports are classified into three generations (UNCTAD 1992b). This classification is mainly based on three criteria: a) seaport development policy, strategy and attitude; b) the scope and extension of seaport activities, especially in the area of information; and c) the integration of seaport activities and organisation. The definition and key features of these generations are shown in Table 3.1.

The seaport generations classification reflects whether the approach by port authorities/operators in developing their activities is likely to be reactive or proactive. These activities start with cargo loading and discharging (traditional activities) and end up with the establishment of a wide range of logistics and value-added activities, developed in conjunction with industrial and commercial businesses (Paixao & Marlow 2003).



**Table 3.1: Definition and Features of Port Generations (port management development—from a transport centre to a logistic platform)**

<b>Generation</b>	<b>Definition and a few characteristics</b>
<b>First</b>	<b>Interface between two modes of transport</b> <ul style="list-style-type: none"> <li>- no specific development strategy</li> <li>- usually either a breakbulk or bulk port</li> <li>- non-organised traditional handling and warehousing activities</li> <li>- activities located on the docks</li> <li>- juxtaposition of port trades</li> <li>- supremacy of the supply—not concerned about the port users' demands</li> </ul>
<b>Second</b>	<b>Centre for transport, industrial activities and commerce</b> <ul style="list-style-type: none"> <li>- expansionist development strategy—volume</li> <li>- industrial facilities are set up within the port area</li> <li>- closer relationship with transport and trade partners (transformation activities (heavy industries), ship services)</li> <li>- more integrated activities within port organisation</li> <li>- widening of the port zone</li> <li>- closer relationship with port users and the locality; start of a port community</li> <li>- occasional relationship between port and adjacent town</li> </ul>
<b>Third</b>	<b>Integrated transport centre with logistics platform for international trade</b> <ul style="list-style-type: none"> <li>- market-oriented development strategy</li> <li>- proactive management rather than reactive</li> <li>- a hub for international and production and distribution network (distribution of merchandises, logistics activities, distribution centre)</li> <li>- rationalisation of port space</li> <li>- united and active port community, coordination of activities</li> <li>- integrated organisational structures</li> <li>- simplified customs procedures</li> <li>- information system (EDI) within the port</li> <li>- strong city/port relations</li> </ul>

Source: Created with Data from UNCTAD (1992b); Alderton (1999)

The concept of port generations was coined by UNCTAD at the beginning of 1990s, and the definition and characteristics of third generation ports appear to reflect the features of current seaports. These ports in addition to cargo handling offer other value-added services such as warehousing, packaging, and distribution that provide additional employment and revenue to the port community. However, in the last few years the concept of “fourth generation ports” has emerged with a direct impact on the organisation/management. These seaports are physically separated but linked through common operators or through a common administration (UNCTAD 1999). An example of a fourth-generation port is the merging of the ports of Copenhagen and Malmö, in

Denmark and Sweden respectively. The port authorities have set up a Swedish joint venture company to manage the combined terminals. Competitiveness has been increased by removing duplication. There would only be one accounts department, one marketing department and one centralised administrative office, which would allow the new port organisation to keep handling charges at a minimum while offering high levels of service (UNCTAD 1999).

The birth of fourth-generation ports (or network ports) is partly attributed to advances in communications and Information Technology (IT) that allow the expansion of an international scale port management through joint ventures and alliances. Network ports (or 4<sup>th</sup> generation) simply mean a group of connected and integrated logistics platforms. The link is no longer the merchandise only, the maritime line or the EDI line, but there exists a unity in management, a coherence of the commercial policy between these places, an establishment strategy, a link through capital, and a sharing of port computer science (ISEMAR 1997). In addition, the development of hub, spoke and feeder networks, with the resulting transshipment activities, has also led to the emergence of multi-port operating companies, such as Hutchinson Port Holdings (HPH), P&O Ports, PSA Corp, and Stevedoring Services of America (SSA), which operate dozens of terminal around the world. In summary, key characteristics of fourth generation ports or network ports can be listed as (UNCTAD 1992b; ISEMAR 1997; Alderton 1999):

- strategy for becoming world-wide (globalisation strategy) and diversification of activities (e.g. ship owners may develop transit activities beside their main jobs as shippers; or they may create their own port terminals, like Maersk, with its hub platform in Spain);
- organisation of logistics services for the shippers;
- EDI networks integrated between ports;
- research of foreign port sites for possible development; and
- cooperation between port communities.

### **3. Seaport Administration/Authority**

Administration of a seaport, its form and structure, is an obvious key to the issue of seaport organisation. Technical development of the seaport also depends, in the first

instance, on the foresight and sound judgement of the administrators (Nagorski 1972). Performance of port authorities is also influenced largely by the structure and design of their organisations. In turn, the structure of a seaport organisation is determined primarily by the nature of trade(s) in which it operates and the scale of its activities (Branch 1986).

Most of the world seaports of today are the result of a long process of historical, social, political, economical and geographical evolution that has produced a great variety of administrative and organisational techniques (Schmidt 1978). In this respect, the World Bank (2001b) declares that there are a number of factors influencing the way seaports are organised, structured, and managed, including:

- The socio-economic structure of a country (e.g. market economy, open borders);
- Historical developments (e.g. former colonial structure);
- Location of the port (e.g. within an urban area, in isolated regions); and
- Types of cargoes handled (e.g. liquid and dry bulk, containers).

Perhaps the only thing which all seaports have in common is their involvement in 'transferring cargo between ship and shore and between port installations and land transport...There is, however, a remarkable degree of variation in the constitutions, forms, degrees of autonomy, powers and operating practices of port authorities, between and often within countries' (Goss 1979, p. 9). Moreover, in other respects, seaports exhibit virtually endless diversity: the nature of the cargo task, geographical conditions, the social, cultural and economic environments, and, not least, the historical determinants of port development all vary immensely (Mayrick 1984).

On the variability of seaport administrative forms worldwide, a seminal international study, which is often referred to, is Goss' 1979 work that makes an initial inventory of the major seaports and the formal structure of seaport administration in several countries. Goss (1979, p. 55) in his comparative study of 39 seaports' management and administration concludes that 'there is no "best" structure of organisation and management of seaports; but there are ways of improving their efficiency...'. His study further deduces that the diversity and variability of seaport administration across the world helps to explicate the extreme range of administrative structures that govern port

operations, and also serves as a caution against assuming that an administrative system, which is demonstrably successful in one context, can be transferred to another.

Seaports usually have a governing body referred to as the port authority, port management or port administration. The term “Port Authority” is used widely to indicate any of these three terms and to sum up all public responsibilities in a seaport (Holocher 1990). In 1977, a commission of the European Union broadly defined a port authority as a ‘state, municipal, public or private body, which is largely responsible for the tasks of construction, administration and sometimes the operation of port facilities and, in certain circumstances, for security’ (Cited in World Bank 2001b, pp. 11-12). In other words, a port authority is a body with juridical status in charge of management of seaports (Dowd 1996; Alderton 1999), responsible for the proper functioning of the seaports (Baudelaire 1986), and accountable for strategic forward planning (Holocher 1990) according to the provisions of its constitution. These characteristics imply that seaports have a high degree of organisational complexity, with areas of port authority responsibility, direct government responsibility and private responsibility.

As indicated earlier, while the requirements of seaport stakeholders are fundamentally the same all over the world and all port authorities share the common purpose of serving the public interest of a state, region or locality, the types/forms of port administration vary widely. Many researchers and writers have noticed that the constitution and objectives of these bodies differs considerably from country to country and in some cases within national boundaries (Bird 1971; Thomas 1976). It is somewhat astonishing that even in seaports of comparable size, and even in major seaports of the same country, completely different administrative forms exist (Stehli 1978).

This rather surprising state of affairs is understandable in the light of the principle that seaports are not the product of one single decision by the competent body but are the result of a differentiated evolution. Therefore the diversity of administrative and organisational forms of seaports can be explained by traditional, historical and geographical reasons (Nagorski 1972) and by the political, social economical environment within which seaports carry out their activities (Stehli 1978; Baudelaire 1986).

However, despite this caveat, there is a surprising degree of agreement between the majority of port management researchers about the diverse forms of ownership adopted and numerous methods of administration undertaken by port organisations for providing facilities and services. These views mainly comprise two classifications of seaport ownership or administration; namely traditional (pre-1980s) and contemporary (post-1980s) classifications. These classifications can be justified by the fact that until the early 1980s most major seaports had adopted the industrial model of port organisation, whereas the post-1980s period is characterised by fundamental changes that cannot be addressed by seaports solely operating according to the principles of the industrial model (Chlomoudis, Karalis & Pallis 2000). The main reason for such a shift of administration style was to address the following: increased the quality of services, high levels of flexibility and adaptability, closer integration with other transport modes, higher levels of product and process innovation, better management and marketing strategies, more efficient labour mobilisation and participation.

Before examining the details of these classifications, it is noteworthy that regardless of the type of ownership and responsibilities of port authorities, a modern port with adequate infrastructure and reasonable superstructure cannot be dominant and really successful unless it is properly administered. Moreover, port organisation and management are the main elements on which the efficiency of ports is to be based (Nagorski 1972).

### **3.1. Traditional Types of Seaport Ownership and Administration**

Traditionally, Goss (1987) believes that many public bodies, such as seaport organisations, were established or had their responsibilities extended in a wide variety of fields before and after the Second World War. He further argues that some of these public bodies were at national level, some at regional (state or province) level and some at local government level (country or city). The literature also explicitly reveals that, before 1980s, seaports operated under the following commonly accepted administrative classifications: state ownership, autonomous (public trusts), municipal ownership, and private ownership. These classifications have sometimes appeared under different titles

in the literature, but they all convey the same meanings. Some examples of different classifications from different authors are shown in Table 3.2.

**Table 3.2: Types of Port Administration**

Author	Types
<b>Oram (1965)</b>	<ul style="list-style-type: none"> <li>- National (government)</li> <li>- Municipal</li> <li>- Corporation or public trust</li> <li>- Private</li> </ul>
<b>Hedden (1967)</b>	<ul style="list-style-type: none"> <li>- Government ministry or department</li> <li>- Private corporation</li> <li>- Mixed stock corporation</li> <li>- Non-profit public corporation entity (the authority)</li> </ul>
<b>Bird (1971)</b>	<ul style="list-style-type: none"> <li>- National state authority</li> <li>- Municipal, with some private firms as tenant</li> <li>- Autonomous public trust</li> <li>- Private</li> <li>- In conjunction with a canal</li> <li>- In conjunction with a railway</li> </ul>
<b>Nagorski (1972)</b>	<ul style="list-style-type: none"> <li>- State</li> <li>- Municipal</li> <li>- Autonomous</li> <li>- Private</li> </ul>
<b>Thomas (1976)</b>	<ul style="list-style-type: none"> <li>- Municipal port administration</li> <li>- Autonomous port authorities</li> <li>- Nationalised port administration</li> <li>- Private port administration</li> </ul>
<b>Stehli (1978)</b>	<ul style="list-style-type: none"> <li>- Autonomous port authority (either national, state, or municipal)</li> <li>- A governmental department, acting under a ministry, custom, navy, or a similar authority</li> <li>- A private company</li> <li>- A railway company, either national or private</li> </ul>
<b>Schmidt (1978)</b>	<ul style="list-style-type: none"> <li>- State</li> <li>- Local (municipal ports and authority ports)</li> <li>- Private</li> </ul>
<b>Beth (1985)</b>	<ul style="list-style-type: none"> <li>- State</li> <li>- Local (municipal ports and authority ports)</li> <li>- Private</li> <li>- Autonomous</li> </ul>
<b>Frankel (1987)</b>	<ul style="list-style-type: none"> <li>- Central government or National port authority</li> <li>- Autonomous port authority</li> <li>- Regional or Municipal port authorities</li> <li>- Private port authorities</li> </ul>
<b>Alderton (1999)</b>	<ul style="list-style-type: none"> <li>- State ownership</li> <li>- Autonomous (public trusts)</li> <li>- Municipal</li> <li>- Private</li> </ul>
<b>Langen (2002)</b>	<ul style="list-style-type: none"> <li>- Public national port authority</li> <li>- Public regional/municipal port authority</li> <li>- Private port authority</li> </ul>
<b>ESPO (2003)</b>	<ul style="list-style-type: none"> <li>- Hanseatic (municipal) port management</li> <li>- Latin (central government) port management</li> <li>- Anglo-Saxon (private) port management</li> </ul>

Source: Created by author from different sources

As can be noted from Table 3.2, there is no universally accepted 'best' solution to the issue of port administration, but a majority of the pioneers of port management have, in one way or another, emphasised the existence of the following types of port administration: National (state), Municipal (regional or local), Autonomous (public trust), and Private. Each of these will be considered separately and briefly.

### **3.1.1. National or State Port Administration**

This category includes all seaports that are centrally controlled by a national port authority with a nationwide system of port administration. A national/state port administration normally operates under a ministry such as Ministry of Transport and Communication or Ministry of Road and Transportation, which in turn delegates powers to local administration. The responsibilities of national port administration may include investment decisions, control of capital investment, port development planning, amalgamation of ports, control of charges, standardisation of ports' profit and loss, review of ports statutes and constitution, and other matters of major importance (Beth 1985).

Some of the main characteristics of national port authorities are outlined in Table 3.3. However, the main disadvantages of this form of administration are political influences and the involvement of a number of ministerial departments (Bird 1971).

### **3.1.2. Municipal, Regional, or Local Port Administration**

This category encompasses those seaports that are controlled locally by a council or municipal corporation. Identification of local community needs and interests is one of the main priorities of this form of administration. According to Alderton (1999, p. 92), a municipal port authority '...has, as one of its major advantages, complete co-operation on all of the local [community] needs of the port', however, a natural unwillingness to co-operate in any national plan is one of the major disadvantages of a municipal port authority.

It is worth noting that many of the world's leading seaports such as Rotterdam, Antwerp, Hamburg and Japanese ports (e.g. Kobe and Yokohama) are owned and

controlled by local and municipal authority. Some of the main characteristics of the municipal form of port administration are listed in Table 3.3.

### 3.1.3. Autonomous (Public Trust) Port Administration

This category comprises the administration of seaports by a statutorily defined authority whose *raison d'être* is the control and management of a single seaport (Meyrick 1984), and whose creation may be based on the fact that centralised port administrations tend to frustrate initiative and discourage an *esprit de corps* (Branch 1986; Baudelaire 1986; Alderton 1999; Roe 1999; Coltof 2000). Therefore, an authority operating as a self-contained unit with extensive autonomous powers offers major advantages such as prompt decision-making, reduced administrative cost, and a more precise orientation towards specific targets (Branch 1986; Holocher 1990). A few main attributes of autonomous port administration are listed in Table 3.3.

This form of administration implies that a major seaport of national importance should be managed by a separate autonomous body (Port Authority or Port Trust) under a non-profit-making quasi-governmental organisation (Nagorski 1972). However, such administration may suffer from insufficiency of funds and may be burdened with unnecessary restrictions (Alderton 1999).

Despite the disadvantages, many port management researchers undoubtedly believe that while direct management by the state and by the central governmental departments has given less satisfactory results, an autonomous port authority has been the most successful form of port administration. In this regard, Bird (1971, p. 197) states:

Many of the studies...come to the conclusion that autonomous port trusts are the best form of port authority for major multifunctional ports. Trusts have the characteristic of independent, non-political administration, jurisdiction over an area regardless of local government boundaries, and a constitution that can be varied to suit different local conditions. The advantages are unity of administration within the port, and an independent financial status gives no chance of a financial policy confounded with a political policy, or of one port being favoured at the expense of another, as is possible when a group of widely separated ports is under one administration.



**Table 3.3: Characteristics of Traditional Types of Seaport Administration**

Type	Characteristics
<b>National/State Port Administration</b>	<ul style="list-style-type: none"> <li>- Centralised control;</li> <li>- Usually under a ministry;</li> <li>- No direct user representation (advisory bodies);</li> <li>- Rationalisation of activities;</li> <li>- Financial strength;</li> <li>- Budget, investment, and tariff approval by the central government;</li> <li>- Obtain investment funds through the government; and</li> <li>- Subject to national political policies.</li> </ul>
<b>Municipal Port Administration</b>	<ul style="list-style-type: none"> <li>- Controlled by the regional, provincial, or municipal government;</li> <li>- Responsive to regional and local interests (identification with local community);</li> <li>- Political influences (subject to regional or local political policies);</li> <li>- Excellent borrowing powers (local rates as collateral);</li> <li>- Improved local and regional planning (operator in line with regional or local planning);</li> <li>- Often, but not generally, non-profit making;</li> <li>- Not designed as profit-making bodies, but usually attempts to obtain a surplus; and</li> <li>- Usually obtains investment funds through public offering such as revenue bonds, general obligation bonds, and the like offered by the port authority or the regional/municipal government.</li> </ul>
<b>Autonomous Port Administration</b>	<ul style="list-style-type: none"> <li>- Public accountability;</li> <li>- Controlled by a board of elected and appointed members;</li> <li>- Unified functional administration over functionally defined area;</li> <li>- In charge of the administration and development of the port, within the framework of the national economic policy;</li> <li>- Legally independent of the government but usually subject to oversight;</li> <li>- Too much user representation;</li> <li>- Non-profit-making; and</li> <li>- Obtains investment funds through its own borrowing, public financing (bonds), and the like.</li> </ul>
<b>Private Port Administration</b>	<ul style="list-style-type: none"> <li>- Controlled by private enterprise;</li> <li>- Financed by private enterprise through internal or public financing;</li> <li>- For-profit-making;</li> <li>- Commercial type management; and</li> <li>- Operates as a dependent division or independent unit of private enterprise.</li> </ul>

Source: Created by the data from Bird (1971); Nagorski (1972); Thomas (1976); Beth (1985); Frankel (1987); Alderton (1999)

### 3.1.4. Private Port Administration

This category of administration includes the seaports that are controlled commercially by private enterprises. The administration is usually run as a commercial enterprise,

with flexible administration geared to maximising profits of the port or associated enterprises, and which sometimes may not be operated to public advantage (Bird 1971). The concept of private port administration is encouraged in many countries with the promise of greater competition, greater investment and higher commercial efficiency. The most frequently cited example of a multipurpose seaport under private control is Felixstow of UK. Some of the main features of private port administration are tabulated in Table 3.3.

### **3.2. Contemporary Types of Seaport Ownership and Administration**

In the eighties, new categories of port authority have appeared in the literature, which divides port administration into three principal types known as landlord port, tool port and service port. Differentiation of these administrative forms can be made with respect to their main characteristics such as (World Bank 2001b):

- Public, private or mixed provision of service;
- Local, regional or global orientation;
- Ownership of infrastructure (including port land);
- Ownership of superstructure and equipment (in particular ship-to-shore handling equipment and warehouses) and
- Status of dock labour and management.

Goss (1990b) concurs with the contemporary classification of port authorities and suggests that the powers and responsibilities of port authorities vary widely, ranging between the two extremes of landlord port and comprehensive port (he combines the tool and service forms of port authorities into one form of port authority and calls it comprehensive). Goss (1990c, p. 286) also foresees ports with a combination of public-private authorities and comes to the conclusion that in the future there will be three kinds of port (almost similar to the contemporary classification); single-user ports, small multi-user-ports, and large multi-user ports.

This classification is consistent with the traditional category of port administration in that the distinctions are based on the same ground of various production factors (land,

capital and labour) (Verhoeff 1981, as cited in Stevens 1999). Furthermore, the contemporary forms of port administration attempt to overcome the confusion over exact areas of responsibilities of port administration and to prevent the adoption of two or more forms of administration simultaneously in one port by classifying these responsibilities universally into three pervasive divisions (Table 3.4).

Table 3.4: Port Authority Responsibilities

Port Authority Responsibilities			
Port Type	Infrastructure	Superstructure	Stevedoring
Landlord	Yes	No	No
Tool	Yes	Yes	No
Service	Yes	Yes	Yes

Source: Saundry & Turnbull (1997, p. 322); Alderton (1999, p. 94); Coltof (2000, p. 24)

In addition, the contemporary standard classification draws a clear distinction between public and private roles in port management and aims to encourage the participation of the private sector in port administration (particularly in landlord and tool models). It further offers options for transferring and repositioning of core seaport services from the public to the private sector<sup>5</sup>. These most common options are presented in Figure 3.1. As can be seen in Figure 3.1, the World Bank (2001c) even further paves the way for full private sector involvement by introducing a fourth category to the contemporary classification of port administration, and calls it ‘fully privatised port’ or ‘private service port’, which fully focuses on private (shareholder) interests.

<sup>5</sup> This is to overcome the shortcomings of contemporary classification as it fails to take account of fundamental institutional changes in port ownership and organisation resulting from recent approaches to privatisation (Baird 2000; Stevens 1999).

**Figure 3.1: Public-Private Roles in Port Management**

Port Activity	Public Service Port	Private Service Port	Tool Port	Landlord Port
Port Administration				
Nautical Management				
Nautical Infrastructure				
Port Infrastructure				
Superstructure (equipment)				
Superstructure (buildings)				
Cargo Handling Activities				
Pilotage				
Towage				
Mooring Services				
Dredging				
Other Functions				

☐ Public Responsibility    ☒ Private Responsibility

Source: Adapted from World Bank (2001c, p. 11)

### 3.2.1. Landlord Port Administration

The landlord port authority is basically a public body that owns the basic infrastructure such as land, access and related assets on behalf of the government, and leases them out to commercial operators or private companies. The authority acts as infrastructure manager, without taking part in the operational activities, and looks after policing of port operations but the actual provision of port services is the responsibility of the private sector or tenant. Goss (1990b) describes a landlord port administration as an authority that plans its port development and exercises overall control over the port activities, but allows private companies to undertake most activities extensively within the port.

In other words, the powers of the port authority are limited to the decisions concerning economic exploitation, the long-term development of the land, and the maintenance of basic port infrastructure such as access roads, berths, and wharves. Private companies provide and maintain their own superstructure, purchase and install their own equipment, and also employ the dock labour (Brooks 2004b).

Therefore, with the goals of effective and strategic management of the port, the port authority as landlord will focus on (Inoue 2002):

- Development function such as long-term planning, infrastructure development and maintenance, and coordination with city/regional development;
- Landlord functions such as asset management, partnership with private sector, and monitoring of fair competition;
- Regulatory functions such as navigation control, safety and security, and environment protection; and
- Facilitation/promotion functions such as provision of port EDI, inter-port cooperation and strategic marketing.

The advantages and disadvantages of the landlord authority are listed in Table 3.5. Examples of landlord ports are Rotterdam, Antwerp, New York and Singapore.

### **3.2.2. Tool Port Administration**

In this form, the port authority owns the infrastructure, the superstructure and heavy equipment, including cargo-handling equipment such as quay cranes, forklift trucks, etc.; and either operates certain types of equipment or rents them to private operators that carry out commercial operations, while retaining all regulatory functions (World Bank 2001b). Therefore, the port authority provides the infrastructure and operates the superstructure, and is responsible for policing the port operation, but the provision of stevedoring services is the responsibility of the private sector.

It is the port authority that purchases and installs cargo-handling equipment, which is usually run by private port operators. Therefore, under this form of port administration, the port authority performs its role of a “tool port authority”, as it has created the tool but does not operate it (UNCTAD 1992c). This is done by regulating, financing, building equipment necessary for the efficient operation of a port and making it available to operators under short term contracts. The private operators are usually small enterprises that perform the stevedoring activities only. Examples of tool ports can be found in the U.S., Europe (e.g. France), Japan, Korea, Asia and Latin American Countries. The advantages and disadvantages of a tool port authority are outlined in Table 3.5.

### **3.2.3. Service (or Operating, Integrated) Port Administration**

Under this type of port administration, the port authority has a predominantly public character that provides all commercial services to ships and cargo, owns and operates every port asset, and fulfils all regulatory functions. The port authority not only acts as the owner and manager but also as the operator. Therefore, it should maintain direct industrial and commercial relations with port users, while retaining its governmental powers vis-à-vis the port community (UNCTAD 1992c). Generally civil servants, usually working under a Ministry of Transport, carry out the actual work and the private sector does not play any role in port activities (World Bank 2001b).

This model of management used to be very common in former centralised economies (socialist countries) and still is in many developing countries such as India and Sri Lanka. The advantages and disadvantages of service port authority are tabulated in Table 3.5.

### **3.2.4. Fully Privatised or Private Service Port Administration**

This type of port administration excludes government or any form of public sector involvement or interest in port activities. All regulatory functions and operational activities are performed by private companies and, contrary to other types of port management, even port land is owned by the private sector (World Bank 2001b). There are relatively few examples of fully privatised seaports with absolutely no public sector participation. These ports can be mainly found in the United Kingdom and New Zealand.

Privatisation means different things to different people and it is a concept often misunderstood. Although it implies, in the most radical perception, the transfer of public assets to the private sector, in the port context the term comprises a variety of forms, ranging from the complete privatisation of the port to the transfer of specific port services to the private sector by means of authorisation, concessions or any other contractual arrangement (Sabatino 1997). Therefore, the first and most important requirement for a fully privatised form of authority is the total disengagement of the public sector. This cannot take place instantaneously. Port reform through privatisation

requires a systematic process of gradual transfer of power, authority, operations and activities from public to private sector (Haralambides, Ma & Veenstra 1997).

Moreover, many port managers view the process of port privatisation as the only way to improve the performance of public port organisations. Among many processes towards transition from public to private, in the 1980s, governments in many countries (mainly in Western countries) adopted and successfully exercised three approaches towards reforming port authorities: commercialisation, corporatisation, and privatisation (Tull & Reveley 2001). According to Ircha (1999), structural adjustment programs in the port sector led to increased interest in institutional reform by economic and trade regulation, and the commercialisation, corporatisation, and privatisation of ports and their activities. These reforms tended to gradually change the ownership structure of the ports (from public to private), modifying the institutional structure of port services, and altering port labour practices. The concepts of these successive levels of reform overlap, and particularly the term of privatisation encompasses a complex array of combinations and permutation. Thus, it is important to briefly clarify the meaning of these terms as they are likely assumed to serve as the stages of privatisation.

In theory 'commercialisation occurs when, without substantial change in corporate structure or owner, a government business enterprise seeks a quantum improvement in its productive economic efficiency' (Amos, Starrs & Kang 1991, p. 41). In the context of seaports, commercialisation involves clarifying the objectives of port authorities requiring them to operate on a more commercial basis by the introduction of a commercial, business-like environment, in which the port management is accountable for its decisions and performance (Haralambides et al. 1997; Tull & Reveley 2001). Whilst the public sector retains ownership and control of ports, the commercialisation process can range from reforms to improve efficiency and profitability to acquiring financial independency from the state by providing port managers with decision-making authority and responsibility similar to that existing in private sector organisations. Therefore, commercialisation can be viewed as a stepping-stone towards privatisation, rather than privatisation *per se* (Baird 2000).

Commercialisation is characterised by decentralisation of the decision-making process and relaxation of the hierarchy of the port organisation, thereby allowing port

management to exercise much greater control over budgeting, procurement and purchasing, maintenance strategies and programming, salary scales and employment conditions of labour and staff, hiring and firing, setting objectives and performance targets, and formulation of strategies (World Bank 2001b).

Satisfactory achievement of port commercialisation reform depends on a successful introduction of changes to suit market needs and customer demands, and more essentially a successful preservation of these changes (Haralambides et al. 1997). Therefore, if a successful transfer of commercial operations from public to private takes place and ports manage to adopt the requirements of commercialisation, ports productivity will significantly improve due to a higher level of inter- and intra-port competition, as the participation of the private sector tends to encourage this competition.

Corporatisation is perceived as the next step on the path to full privatisation as it goes further than commercialisation in that it involves the transformation of the public port authority into a corporation. It is a process of legally restructuring the port as a private business enterprise under the country's company law (private corporate law), although ownership may remain vested with the government (Ircha1999). It requires the establishment of public or state owned companies (corporate entities) with clear objectives to take over the business of providing port services, or to transform the public sector organisations into these public companies, while the port assets are leased to the private sector (Haralambides et al. 1997; Baird 2000).

Therefore, the key requirements for the corporatisation process are the establishment of clear accountability arrangements and the presence of competitive neutrality where the public enterprise faces exactly the same market conditions as competing organisations in the private sector (Tull & Reveley 2001). Successful implementation of these requirements, along with corporatisation's financial autonomy and commercial accounting procedures, will generate more transparent financial costs and facilitate the identification of sources of inefficiency. Furthermore, corporatisation may lead to successful privatisation as it allows time to management to settle into its new role before contemplating full privatisation.



Ultimately, a port that has practiced commercialisation and corporatisation is more prone to full/comprehensive or partial privatisation than a public port. Advocates of privatisation believe that corporatisation is a stepping-stone to privatisation (Amos et al. 1991), and privatisation provides the same flexibility to the management as commercialisation (World Bank 2001b). However, these perspectives have been challenged by De Monie (as cited in Winkelmans 1997, pp. 145-146) when he stated:

What the national authority has called privatisation is sometimes nothing more than some form of commercialisation or corporatisation of the Port Authority in order to deflect the demand for much greater private sector involvement and safeguard acquired prerogatives and vested interests of the public sector.

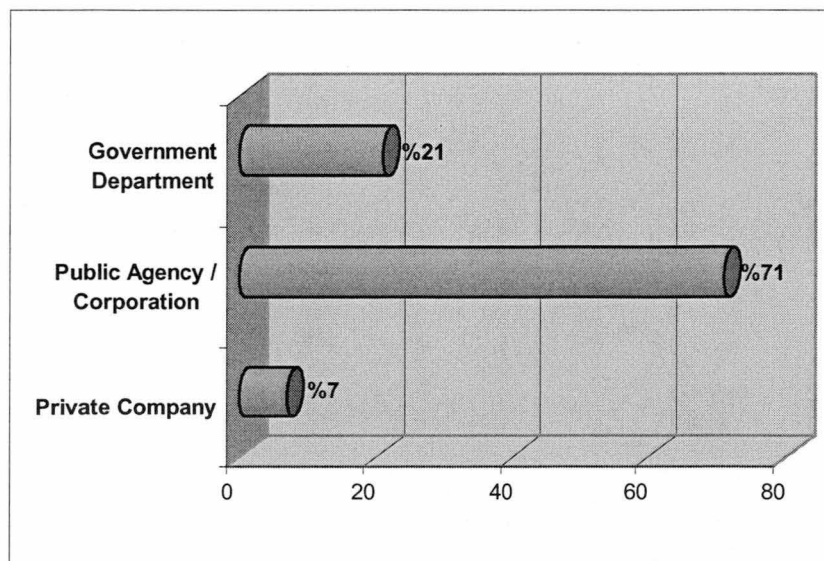
In its purest form, privatisation is the sale of public assets and transfer of port ownership and management to the private sector; the influence of the public sector is partially or totally eliminated (Winkelmans 1997). Therefore, privatisation of the ownership and operation of seaports is used as a major policy initiative by many governments seeking port reform. The reasons for the adoption of such a policy vary from port to port. However, the main reason for privatisation is based on the assumption that the private market is the most efficient means of allocating resources, and therefore decreasing the role of government in the management of ports will eventually benefit the country (Baltazar & Brooks 2001). In fact, this ideology underlies the port privatisation initiatives undertaken in UK (Thomas 1994). The purported advantages of port private ownership stem from the discipline imposed by the need to generate profit, which means that a private firm may have stronger incentives to be more cost conscious, efficient, and customer oriented than a public enterprise (Tull & Reveley 2001). Other reasons may include (Kimberley 2000):

- Improving efficiency, productivity and management capability;
- Encouraging and increasing inter- and intra-competition;
- Encouraging broader citizen participation in share ownership;
- Reducing financial burden on the public sector (reducing demand on the public sector budget);
- Increasing revenue generation without increasing investment and risk;
- Enhancing quality of port services and reducing the cost of port services;

- Ceding the specialised tasks of port management to the private sector, thereby reducing political exposure (elimination of political interference) and gaining political reputation for a proactive approach to trade and globalisation; and
- Removal of trade barriers.

These conditions only apply to fully privatised ports, whereas full privatisation may not be a desirable option for many major ports and is rarely found in practice. Thus, there are different forms of privatisation methods, which public ports can adopt respective to their local circumstances, preferences and the extent they want to involve private sector participation (Baird 2003). In 1999, the IAPH conducted a global survey of its members to verify the extent of the private sector's involvement in the port industry (Inoue 2002). The vast majority of the respondents indicated that their organisation was a public agency/corporation established by government. Approximately 20 per cent had experienced significant changes in their structure during the last two years (prior to the survey) with an increasing tendency towards some form of privatisation. The result (Figure 3.2) revealed that the overwhelming 92 per cent of the world ports remained owned and managed by public bodies. As a real minority, only 7% of ports were private companies. Therefore, full port privatisation, in terms of transferring ownership of the port from public to private, has only occurred on a very limited scale. It is in port development and terminal operations that the private sector has significantly expanded their business (Inoue 2002).

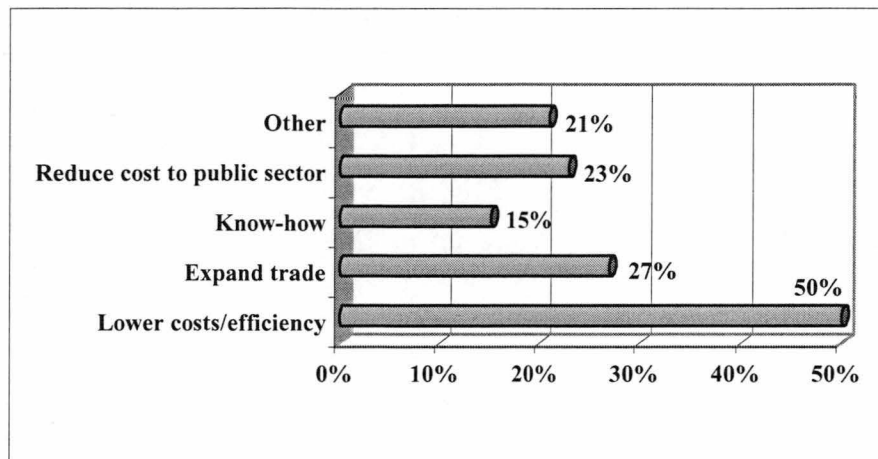
**Figure 3.2: Port Authority by Organisation Type**



Source: Adapted from Inoue (2002)

A further survey of seaports was undertaken by Napier University, with a focus on the world's top 100 container ports, to identify the objectives and methods used by ports to effect privatisation (Baird 2002). The results of this survey revealed that the most common objective of privatisation is to increase efficiency, and consequently to lower port costs; with 50% of the ports identifying this factor (Figure 3.3).

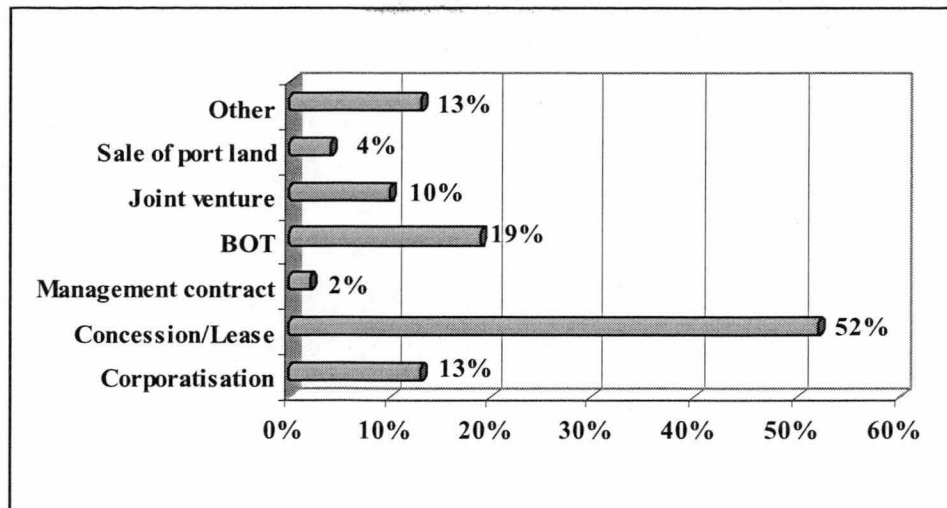
**Figure 3.3: Aims behind Bringing in Private Sector**



Source: Adapted from Baird (2002, p. 277)

Baird (2002) reports that as far as the methods of privatisation are concerned, terminal concessions and leasehold arrangements are the most common methods used by ports to facilitate private sector intervention. These methods have been utilised by 52% of ports (Figure 3.4). In the end, Baird (2002, p. 282) concludes his report by stating:

However, while the evidence suggests significant involvement of the private sector, especially [or mainly] in port operations and services, this does not detract from the fact that the public sector, in virtually all instances, takes much more than just a passing interest in its seaport system...Whether through a port authority, marine department, or other body, in the vast majority of countries the public sector retains a central role in seaport planning, regulation, development and investment.

**Figure 3.4: Methods of Privatisation Used by Ports**

Source: Adapted from Baird (2002, p. 278)

From the above discussion it can be inferred that although it is widely viewed that public bodies are not always efficient and productive (Winkelmans 1997), the fully privatised port administration model, where private companies are in charge of all regulatory functions and operational activities, is also not a preferred option. Further, if full privatisation happens, 'as it sometimes does, the fox would be in charge of monitoring or overseeing the chicken barn, and the potential for abuse of the natural monopoly position that ports may enjoy increases dramatically' (Baltazar & Brooks 2001, p. 7).

The disadvantages of the privatised form of port authority have been acknowledged by Saundry and Turnbull (1997) in their study and assessment of UK privatised ports where they emphasised that privatisation was not only proven costly, but unnecessary, ineffective, counter-productive in many respect, and a constraint to certain forms of competition. A summary of advantages and disadvantages of privatised port administration are listed in Table 3.5.

**Table 3.5: Advantages and Disadvantages of Contemporary Forms of Port Administration**

<b>Landlord</b>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>- A single entity (the private sector) executes cargo-handling operations and owns and operates cargo-handling equipment;</li> <li>- The terminal operators are more loyal to the port and more likely to make needed investments as a consequence of their long-term contract; and</li> <li>- Private terminal handling companies generally are better able to cope with market requirements.</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>- Risk of over-capacity as a result of pressure from various private operators;</li> <li>- Duplication of marketing effort as both terminal operators and the port authority visit potential customers; and</li> <li>- Risk of misjudging the proper timing of capacity additions.</li> </ul>
<b>Tool</b>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>- Investments in port infrastructure and equipment (in particular ship/shore equipment) are decided and provided by the public sector, thus avoiding duplication of facilities.</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>- The port administration and private enterprise jointly share the cargo handling services (split operation), leading to conflicting situations;</li> <li>- Because the private operators do not own major equipment, they tend to function as labour pools and do not develop into firms with strong balance sheets. This causes instability and limits future expansion of their companies;</li> <li>- Risk of under-investment; and</li> <li>- Lack of innovation.</li> </ul>
<b>Service</b>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>- Superstructure development and cargo handling operations are the responsibility of the same organisation (unity of command).</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>- There is no or only a limited role for the private sector in cargo handling operations;</li> <li>- There is less problem-solving capacity and flexibility in case of labour problems, since the port administration also is the major employer of port labour;</li> <li>- There is lack of internal competition, leading to inefficiency;</li> <li>- Wasteful use of resources and under-investment as a result of government interference and dependence to government budget; and</li> <li>- Lack of innovation.</li> </ul>
<b>Privatised</b>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>- Maximum flexibility with respect to investment and port operations;</li> <li>- No direct government interference;</li> <li>- Ownership of port land enables market oriented port development and tariff policies;</li> <li>- In case of development, private operator probably realises a high price for the sale of port land; and</li> <li>- The often strategic location of port land may enable the private operator to broaden its scope of activities.</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>- Government may need to create a port regulator to control monopolistic behaviour;</li> <li>- The government (be it national, regional or local) loses its ability to execute a long term economic development policy with respect to the port business;</li> <li>- In case the necessity arises to redevelop the port area, government has to spend considerable amounts of money to buy back the port land; and</li> <li>- There is a serious risk of speculation with port land by private owners.</li> </ul>

Source: Adapted from World Bank (2001b); Brooks (2004b)

As can be noted, port reform processes are complex and no perfect model exists. Each model has its own shortcomings and disadvantages that make it impracticable in some cases. It is deemed by many port management researchers that the role of government in the control of ports (inclusive of a regulatory role) should not be completely diminished. Whatever form of port reform is adopted, the ownership of all lands should preferably be retained by the government port authority so as to permit some measure of future government control over the operating monopolies (Lethbridge & Ra'anan 1991). This is contrary to the features of the fully privatised form, and conforms to the characteristics of the landlord form of port authority and its worldwide acceptability. Therefore, it is not coincidence that the majority of the world's most successful ports conform to the landlord model, with public sector involvement in the administration of the port as both land owner and regulator (Saundry & Turnbull 1997).

#### **4. Organisation of Iranian seaports**

Having discussed the position of Iran's seaports in the national transportation network (Chapter 2) and various forms of port administration and authority as being practiced around the world, what logically follows is the current practice of seaport organisation in Iran. This provides the context for the core focus of this research. Therefore, this section depicts the practice of seaport organisation in Iran.

According to Iran's Plan and Budget Organisation (2001), the system of organisations in Iran carrying out precise planning are categorised into three types: state, cooperative, and private.

The state sector includes: major industries; heavy industries; international trade; large mines; insurance; energy supply; water supply network; radio and television; communication (post, telegraph, and telephone); aviation; navigation; roads, railways, and seaports. The cooperative sector encompasses: cooperative companies, and institutes which operate according to the Islamic codes<sup>6</sup> in the production and distribution of goods in urban and rural sectors. The private sector comprises the

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<sup>6</sup> This refers to the legal Islamic system in keeping with the code of behaviour called for by the Holy Qur'an (Koran); e.g. according to Islam, the one of the four rules that govern investment behaviour is 'the discouragement of the production of goods and services which contradict the value pattern of Islam (Haram or forbidden in Islam), such as trade of alcoholic beverage (Suleiman 2000).

activities which complement the activities of state and cooperative sectors in agriculture, animal farming, industry, trade and services.

As long as ownership in the above-mentioned categories (state, cooperative, and private) is in accordance with the principles of the country's constitution, the Islamic codes, and cause prosperity and development of the country's economy, it would be supported by the codes of Islamic Republic.

Based on the above classification, the organisation and ownership of Iranian seaports falls into the first category (state). That is, all commercial seaports including major and minor are owned and governed by a governmental/public organisation called Iran's Ports and Shipping Organisation (PSO). PSO is affiliated to Iran's Ministry of Roads and Transportation, and its president is the deputy of Iran's Minister of Roads and Transportation.

#### 4.1. History

The Iran's Ports and Shipping Organisation (PSO), as we know it today, is the result of a very turbulent past, and was subject to many changes in its structure and authority. According to Oram (1965), PSO (1995) and PSO (2002), the initial establishment of PSO dates back to 1814 when a department called the "South Customs Branch" was set up at Bushehr to monitor the Iranian coasts and seaports and to fulfil the functions of marine and port affairs. The "South Customs Branch" was only responsible for the southern ports of Iran and, at that time, Iranian government did not have any control over its only northern port on the Caspian Sea (Anzali)<sup>7</sup>.

At the start of the 20<sup>th</sup> century, Russia transferred the control and administration of Anzali to Iran, and in 1928, Khoramshar port (largely destroyed during the Iraq-Iran war) started to gain importance as one of the gateways for Iran's sea trade. In the same year, as the number of ports and their activities were increasing and in order to systematically manage the port related issues, the "General Directorate of Ports" was formed in Tehran (Capital) which later became the foundation of the present PSO's headquarters.

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<sup>7</sup> At that time port of Anzali was being administered by Russians.

In 1938, Iran's Cabinet passed the blueprint of "Port Legislations" which had been prepared and tabled by the Ministry of Roads. This approval marked the transfer of the "General Directorate of Ports" from the "General Directorate of Customs" to the jurisdiction of the Ministry of Roads, except for those ports where the Ministry of Roads had no representative.

In 1946, the "General Directorate of Ports" was replaced by the new title of "General Corporation of Ports and Shipping". By 1952, a bill including 18 articles for ships' registration and utilisation was enacted by Cabinet, which obliged Iranian vessels sailing in domestic and coastal waters to register and obtain a certificate in one of the Iranian seaports.

In 1959, following an agreement between the Ministry of Roads and the Ministry of Customs and Monopolies, the "General Corporation of Ports and Shipping" was transferred back to the newly formed Ministry of Customs and Monopolies (this Ministry later changed its title to the Ministry of Economy and Finance). Following this transfer, in 1960, the title of "General Corporation of Ports and Shipping" was changed to "Ports and Shipping Organisation (PSO)". As a result of these developments, the organisation was delegated the task of exercising the authority of government to control all seaports and maritime affairs, implement the port and coastal shipping regulations, promote shipping and commerce, levy port duties and taxes, and register Iranian ships.

In 1964, Iran's Maritime Act including 914 articles was put into effect. In 1969, the present Ports and Shipping Organisation (PSO) gained the status of a legal entity, and its functions and organisational structure were formally declared. Internal policies and procedures for financial transactions and for the recruitment of staff were approved by the organisation's supreme council in 1970. Finally, in 1974, the organisation was returned to the Ministry of Roads and Transportation from the Ministry of Economy and Finance, and has remained an affiliate of this Ministry to date.



## 4.2. Functions

PSO has a vast range of responsibilities for the administration of seaports and maritime affairs of the country. Article 3, chapter 2 of PSO's statute, approved in 1970 (still in force), defines the details of PSO's functions as (PSO 1995, pp. 9-11):

- Administration of seaports and commercial maritime affairs of the country;
- Construction, completion and development of buildings, facilities, seaports and shipping repair yards and related equipment, and their utilisation;
- Preparation, formulation, and implementation of port, maritime, and commercial shipping legislation according to their respective laws;
- Formulation of pilotage related rules subject to the approval of the Supreme Council of the organisation;
- Administration of cargo loading and discharging, cargo handling within port areas, and warehousing in ports where the organisation has a department or a branch;
- Administration and installation of telecommunication networks (radio, telegraph, telephone, teletype, etc.) at sea and shore for communicating with ships and affiliate ports with the cooperation of the Ministry of Communication;
- Thorough control of coastal and commercial shipping activities and striving to develop them to ensure safety of maritime traffic;
- Administration and installation of navigational lights, marks, and buoys to ensure safe passage and to secure safety of maritime traffic;
- Registration of Iranian ships and commercial fleets, and implementation of related regulations;
- Granting certificates of competency to seamen and seaworthiness to vessels according to related regulations;
- Collection of port and river duties, charges for loading, discharging, cargo handling and warehousing, and other dues which are legally collected by other governmental organisations on behalf of PSO;
- Implementation of the Iranian Maritime Act and performing the responsibilities laid down in the act referring to the establishment of PSO;
- Determination of method and tariff for exploiting port facilities, and fixed and mobile equipment (infrastructure);

- Organisation of scientific research, studies, and surveys on maritime, port, and shipping issues;
- Preparation of the next year's plan as well as long-term development plans, and their implementation subject to the Supreme Council's approval;
- Evaluation of draft international agreements and treaties concerning port, shipping, and maritime affairs before presenting them to relevant authorities;
- Membership in international organisations related to port, shipping, and maritime affairs upon the approval of the Supreme Council and the Islamic Consultative Assembly;
- Participation in international port and maritime related conferences, associations, and meetings;
- If necessary, determination of free zones, and formulation of regulations and conditions of their use subject to the approval of the Supreme Council and the Islamic Consultative Assembly;
- Control of railways from the point of entrance into port boundaries to the point of exit from port areas, and dispatching wagons and locomotives to open storage areas and sheds;
- Establishment of a training institute for pilots and those engaged in maritime activities, and sending students overseas to study those specialised courses which the organisation deems necessary;
- Issuing permits to construct berths or other installations while reserving the right to monitor the construction and operation;
- Issuing permits for establishing offices, seamen clubs, restaurants, warehouses, and other necessary facilities upon the request of authorised individuals. Taking into account its capabilities in ports, the organisation can lease out land for the construction of above-mentioned facilities;
- Transferring part of the tasks (where their accomplishment by private sector would be beneficial to the organisation) of the organisation to qualified private sectors; and
- Taking measures to reduce tariffs, and expediting the cargo loading and discharging processes, and reducing the waiting time of vessels at ports to support the economy of the country.

These 25 functions can be summarised into the following four main functional areas:

1. Provision and ownership of ports' fixed and mobile equipment for cargo handling, navigational aids, and communication;
2. Ports management and operation (major and minor commercial ports);
3. Construction and maintenance of ports' superstructure and infrastructure, and the provision of obligatory services such as dredging, pilotage and tug services; and
4. Enforcement of maritime law, pollution prevention convention (i.e. MARPOL), SOLAS, maritime training and competency issues.

### 4.3. Structure

Articles 4 to 12, chapter 3 of PSO's statute, approved in 1970 (still in force), outline the governing authorities in charge of administration of seaports as follows<sup>8</sup> (PSO 1995, pp. 11-15):

1. The Supreme Council: the Council is involved in macro policy and decision-makings such as enactment of the organisation's annual budget. It consists of the following:
  - Minister of Finance and Economic Affairs;
  - Minister of Roads and Transportation (President of the Supreme Council);
  - Minister of Defence;
  - Head of Management and Planning Organisation (Deputy President); and
  - Commander of the Navy.
2. The Board of Directors: the board includes the Managing Director (President) of PSO and his four deputies (Figure 3.15, broken lines); namely:
  - Vice-President Maritime Affairs;
  - Vice-President Ports' Affairs and Special Economic Zones;
  - Vice-President Technical and Engineering; and
  - Vice-President Planning, Finance and Administration.

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<sup>8</sup> The fine details of their responsibilities are beyond the scope of this research.

3. The Managing Director (President): the highest rank in the organisation and has overall command of the organisation. The person for this position is recommended by the Minister of Road and Transportation and approved by the Supreme Council.

As depicted in Figure 3.5 (structure of PSO's Headquarters in Tehran), four Vice-Presidents report directly to the President, and each deputy or Vice-President has, in turn, 3 to 4 Directorate Generals who are accountable to their respective Vice-presidents. In addition, each province (total of 6 branches in 6 major ports) has a "Directorate General-Port and Shipping" who reports directly to the President of PSO.

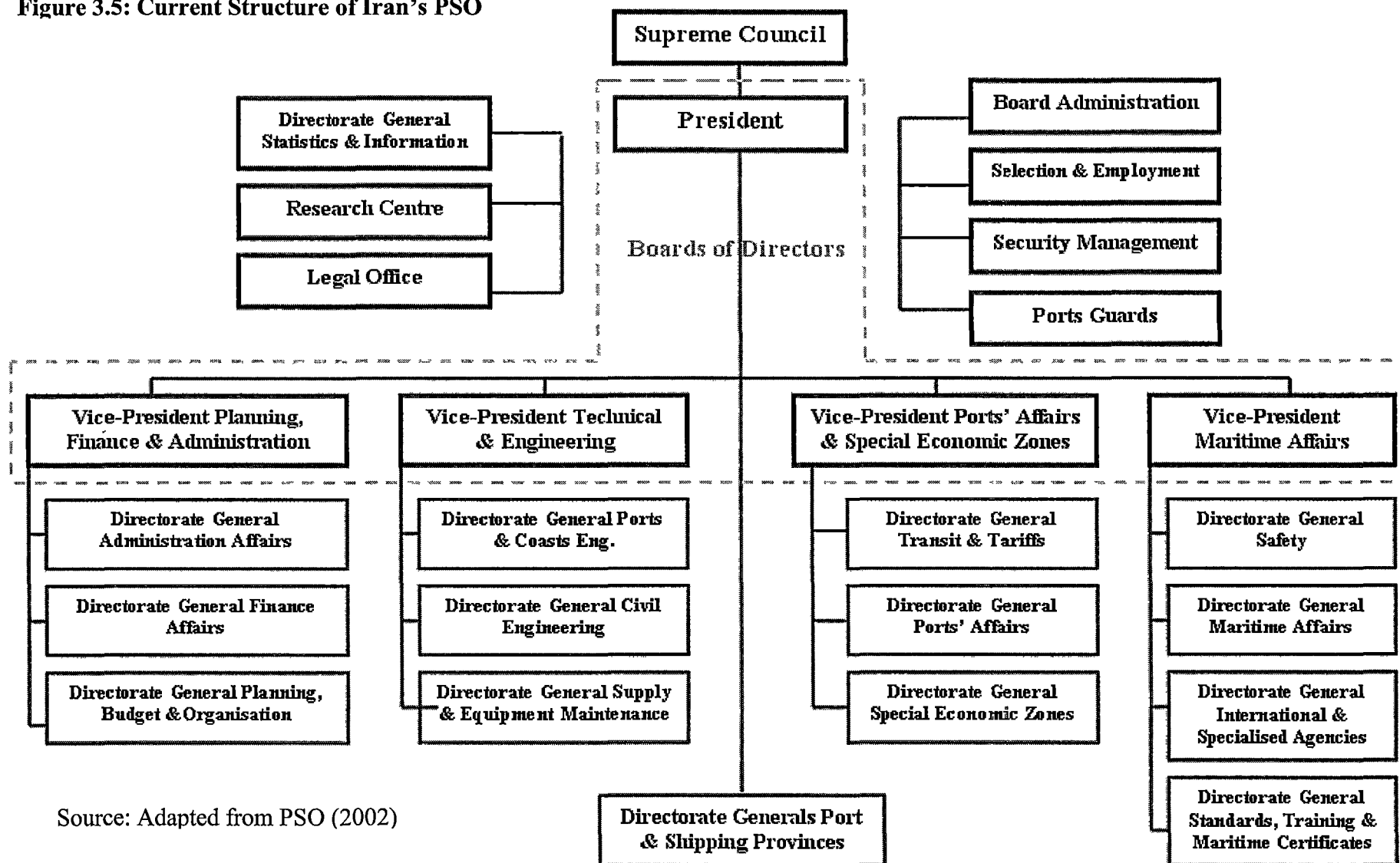
The six branches in six provinces<sup>9</sup> (where six major seaports are located) have exactly the same structure as headquarters (Figure 3.5), but without the Supreme Council and Board of Directors. Each Directorate General (appointed by PSO's President) has the overall responsibility for all the activities of his port.

The organisation is run by a total of about 4000 personnel both in headquarters and port branches. As is quite evident, the structure of the organisation, as a public entity, is heavily centralised, and major decisions and policies are made in headquarters and then decreed to branches for implementation.

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<sup>9</sup> 1. Hormozgan Province (Bandar Abbas port); 2. Khozestan Province (Bandar Imam Khomeini port); 3. Bushehr Province (Bushehr port); 4. Sistan and Baluchistan Province (Chabahar port) 5. Gilan Province (Anzali port); and 6. Mazandaran Province (Noshahr port).

Figure 3.5: Current Structure of Iran's PSO



Source: Adapted from PSO (2002)

#### 4.4. Goals/Policies/Strategies

Following the 1979 victory of the Islamic Revolution in Iran and the subsequent Iraqi invasion much of the data on Iran's post revolutionary economic affairs during the 1980's points to many undeniable economic shortfalls and setbacks. Soon after the end of the eight-year imposed war in 1988, the country's full-scale reconstruction efforts commenced. Policies changed from those of war orientation to a framework of peacetime reconstruction. The result of these policies led the decision makers to introduce and implement the nation's three Five-Year Development Plans (FYDP). The first Five-Year Social, Cultural and Economic Plan was designated for the period 1989 to 1993, the second FYDP was implemented from 1995 to 1999, and the third FYDP was commenced in 2000 and was completed by the end of 2004.

By analysing the objectives of these plans, it is evident that the future policies and strategies of all governmental organisations are clearly drawn. The policies and strategies of PSO, as a component of the country's transportation sector, have also been clearly manifested in these plans. For example in the first FYDP, it was projected that the exploitable capacity of the country's commercial ports should be expanded from 16 million tonnes in 1988 to 30.5 million tonnes. By the end of the plan in 1993, the total capacity was expanded to around 28 million tonnes, slightly less than projected target (Iran Management and Planning Organisation 2004).

Similarly, the last FYDP (2000-2004) envisioned a set of strategies for PSO, which reflect the main framework/guideline for the maritime sector and were supposed to be achieved by the end of 2004<sup>10</sup>. A summary of these policies/goals/strategies is as follows (PSO 2002):

- Promotion of productivity through optimum utilisation of resources, equipment and installations, and emphasis on maintenance;
- Delegation of more powers to managers and implementation of non-governmental management in utilisation of the fleet;

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<sup>10</sup> At the time of compiling this research, the results of this plan were not published by the government.

- Promotion of maritime culture and encouraging marine voyages through development of facilities;
- Planning for optimal use of the strategic location of the country in the international trade and provision of necessary support for the transit of cargo and tourism and active presence in regional markets;
- Making the tariffs competitive;
- Maintenance of safety and protection of the marine environment in accordance with international standards;
- Completion of the major commercial ports and development of fishing ports of the country;
- Study and development of a master plan for coasts and ports within the framework of the processing logistics plan of the land;
- Elimination of parallel departments in order to prevent mission interference and elimination of redundant decision-making centres;
- Establishment of a necessary and integrated data-base in marine-related fields;
- Development of advanced communications and Electronic Data Interchange (EDI) throughout the country and application of advanced technology and modern management techniques;
- Establishment and fitting up measurement stations for climatic and marine conditions and development of research and academic centres;
- Centralised policy and decentralised procedures;
- Development of container transportation;
- Legal and financial support for the non-government sector through cession of financial and banking facilities in the maritime transportation sector;
- Attraction of domestic and foreign investments;
- Privatisation through implementation of private management in accordance with trade law on governmental investment; and
- Implementation of incentive policies for the establishment of maritime transportation corporations.

It was explained at the outset of this section that based on the Iranian government classification, the organisation and ownership of Iranian seaports accords with the “State” category. Similarly, in the light of above descriptions (the structure, functions, and policies of PSO), the organisation of Iranian seaports falls into the standard

category of “National or State Port Administration” of the “Traditional Types of Seaport Ownership and Administration” (described in section 3.1.1), with the same characteristics such as: centralised control; operating under a ministry; no direct user representation (advisory bodies); rationalisation of activities; financial strength; budget, investment, and tariff approval by Supreme Council (the central government); obtaining investment funds through the government; and subject to national political policies.

However, practically speaking, the organisation is making progress towards the characteristics of a “Tool Port” of “Contemporary Types of Seaport Ownership and Administration” (described in section 3.2.2), where the port authority owns the infrastructure, the superstructure and heavy equipment; and either operates certain types of equipment or rents them to private operators that carry out commercial operations, while retaining all regulatory functions.

## 5. Summary

Based on a number of criteria, seaports are basically classified into three generations; namely first, second and third—each with its own distinctive definition and characteristics. However, during the last few years, the concept of fourth generation seaports has emerged with a direct impact on the organisations. The features of current seaports are mostly reflected by the definition and characteristics of third generation seaports. This is because, in addition to the usual seaport services, they offer other value-added services that provide additional employment and revenue to the port community.

While seaport authorities all over the world share the common purpose of serving the public interest of a state, region or locality, forms of seaport ownership and seaport administration vary widely. That is, diverse forms of ownership have been adopted with numerous methods of administration, with different constitutions and objectives, undertaken by seaport organisations for providing facilities and services. Generally speaking, seaport ownerships or administrations can be classified into; traditional (pre-1980s) and contemporary (post-1980s) types. Traditional types of seaport ownership and administration include National (state), Municipal (regional or local), Autonomous



(public), and Private forms of seaport authorities. And the contemporary types comprise Landlord, Tool, Service, and Fully Privatised forms of seaport authorities.

Reviewing different models of seaport ownership and administration reveals that port reform processes are complex and no perfect model exists. Each model has its own disadvantages that make it impracticable in some cases. However, a lesson that can be learnt is that the role of government in the control of seaports (inclusive of a regulatory role) should not be completely diminished. That is, whatever form of port ownership and administration is adopted, the ownership of all lands should preferably be retained by the government port authority so as to permit some measure of future government control over the operating monopolies. This, in fact, conforms to the characteristics of the landlord form of port authority and its worldwide acceptability.

As far as the ownership and administration of Iranian seaports is concerned, all commercial seaports (including major, multipurpose, and minor) are publicly owned and operated by Iran's Ports and Shipping Organisation (PSO) which is an affiliate of the Ministry of Roads and Transportation.

Based on PSO's structure, functions, and policies, the organisation and ownership of Iranian seaports conforms to the "National or State Port Administration" of the "Traditional Types of Seaport Ownership and Administration", which corresponds to the "State" category of the country's system of organisation. However, with the partial involvement of the private sector in practice, it seems that the PSO is moving toward adopting the characteristics of a "Tool Port" of "Contemporary Types of Seaport Ownership and Administration".

Clearly, seaports are an integral part of a nation's transport network and their effectiveness is a matter of some importance to users, providers and policy makers alike. Port efficiency and performance is a well researched and documented area however, the effectiveness of a port's organisation is not. As a consequence the next chapter is devoted to the concept of Organisational Effectiveness (OE). It will present an in-depth review of the literature pertaining to OE and its construct with the aim of finding an appropriate model for the assessment of OE in seaport organisations.

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# Chapter 4

## Organisational Effectiveness (OE)

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### 1. Introduction

The importance of seaports as an important integral element of transportation networks and their impacts on national development has already been discussed. It was shown that the efficiency and performance of seaports is directly and indirectly influenced by their organisation and the styles adopted to manage them. Consequently, it is postulated that effective seaport organisations will considerably improve the efficiency and performance of their seaports which, in turn, would have positive effects on the nation's transport systems and the country as a whole. This verifies the importance of organisational effectiveness and its assessment method(s) in seaport organisations, which is the core proposition behind this chapter.

Organisational Effectiveness (OE) is a chapter of organisation theory. OE has been one of the most sought after, yet elusive, fields of research since the early development of organisational theory (Rojas 2000), and finding a correct and meaningful definition and/or construct for OE has always been a difficult task for all researchers.

As organisations vary in their strategies, structures, functions and products, their effectiveness indicators also differ respectively. An organisation can be effective or ineffective on a number of different facets that may be relatively independent of one another (Campbell 1977). Therefore, it is very difficult, if not impossible, to develop a standardised list of criteria of effectiveness that could be applied to all types of organisations.

Any systematic approach to assess OE in a given organisation has to, at least, satisfy two crucial interrelated requirements. First, it should identify the specific and appropriate criteria for OE assessment in that organisation and second, it must conceptualise a model of OE using the identified criteria. To assist in fulfilling the first requirement, a list or menu of available criteria (i.e. criteria that exist in the literature) must be produced. As this research is about OE assessment in seaport organisations, where no model of OE for these organisations exists in the literature, the objectives of this chapter are to introduce the concept of OE, to review the existing relevant models of OE developed for other organisations, to extract all their criteria, and finally to produce a list as a preliminary step for fulfilling the above first requirement of OE assessment. Accordingly, the next chapter will concentrate on identification of appropriate OE criteria to seaport organisations (first requirement) and development of an OE model with the identified criteria (second requirement).

## **2. The Nature of Organisational Effectiveness (OE)**

The main problem with much of the research into organisational effectiveness is that it generally fails to take account of the full range of issues that impinge on those phenomena (Kriengler, Dawkins, Ryan & Wooden 1988). This assertion may be true because indicators of effectiveness for a particular organisation may not fit other organisations performing almost similar activities. Furthermore, the definitions of effectiveness are likely to vary from one researcher to another.

The organisational effectiveness phenomenon emerged in the early 1950s, and has been a difficult construct at the centre of attention of many organisation scholars and researchers ever since. It has become a school of thought for many organisational theorists, and a crucial step in the organisational assessment process particularly from the 1950s to 1980s, during which many researchers have offered a variety of models (Yuchtman & Seashore 1967; Price 1968; Steers 1975; Goodman & Pennings 1977; Campbell 1977; Zammuto 1984; Hitt 1988) for examining organisational effectiveness. There is however still little consensus over what constitutes a valid set of effectiveness criteria. Hannon and Freeman (1977) even question whether organisational effectiveness is a researchable topic because of the confusion.

In the 1950s, OE was referred to 'as the extent to which an organisation as a social system...fulfils its objectives' (Georgopoulos & Tannenbaum 1957, p. 180). In the 1960s, OE was defined as the ability of an organisation to exploit its environment in the acquisition of scarce resources (Yachtman & Seashore 1967). In the 1970s, it was viewed as the relative ability of the members of an organisation to mobilise their centres of power towards productivity, adaptability, and flexibility (Mott 1972). As constructivist thinking became more standard in organisational theory in the 1980s and 1990s, it was recognised that identifying organisational goals, for OE assessment, is more complex than it was first thought (Lusthaus et al. 2002). Therefore, the studies were directed towards multiple constituency models of OE (Connolly et al. 1980; Gaertner & Ramnarayan 1983), which suggest that organisations are effective to the extent to which their constituencies are at least minimally satisfied (Lachman & Wolfe 1997).

This conceptual disarray and methodological ambiguity surrounding the OE and its constructs led Hitt (1988, p. 29) to state that 'organisational researchers and organisational executives both need assistance because of no commonly accepted approach to the measurement of organisational effectiveness'. He further urges that theory regarding organisations cannot be advanced far without using appropriate measures of organisational effectiveness.

There is a certain amount of empirical literature dealing with the measures of organisational effectiveness. Despite the diversity of OE definitions, models, and their measures across the literature, the choice of measures or indicators to assess organisational effectiveness still remains the most critical decision to be made (Scott 1997). This is mainly because; firstly the review of these studies proves that the organisational effectiveness means different things to different people, secondly the literature reveals inconsistency regarding the appropriate measure(s) of organisational effectiveness to be used in organisational research. For example, Table 4.1, which lists a total of 30 variables from different studies as indicators of organisational effectiveness, reveals that there is no lack of variables associated with the concept of organisational effectiveness. However, research literature has been less specific as to how such variables contribute to a meaningful understanding of the OE construct in a specific organisation. In this regard, Katz and Kahn (1966, p. 149) explain:

There is no lack of material on criteria of organisational success. The literature is studded with references to efficiency, productivity, absence, turnover and profitability - all of those offered implicitly or explicitly, separately or in combination, as definitions of organisational effectiveness. Most of what has been written on the meaning of these criteria and on their interrelatedness, however, is judgmental and open to question. What is worse, it is filled with advice that seems sagacious but tautological and contradictory.

As can also be noted from Table 4.1, some of the items are overlapping (e.g. planning and goal setting, goal consensus, and achievement emphasis) and some are even contradictory (e.g. absenteeism and participation and shared influence). Furthermore, the variety of items proves the diversity of organisations being evaluated.

Table 4.1: Organisational Effectiveness Criteria

List of Organisational Effectiveness Criteria	
1. Overall Effectiveness	16. Planning and Goal Setting
2. Productivity	17. Goal Consensus
3. Efficiency	18. Internalisation of Organisational Goals
4. Profit	19. Role and Norm Congruence
5. Quality	20. Managerial Interpersonal Skills
6. Accidents	21. Managerial Task Skills
7. Growth	22. Information Management and Communication
8. Absenteeism	23. Readiness
9. Turnover	24. Utilisation of Environment
10. Job Satisfaction	25. Evaluations by External Entities
11. Motivation	26. Stability
12. Morale	27. Value of Human Resources
13. Control	28. Participation and Shared Influence
14. Conflict/Cohesion	29. Training and Development Emphasis
15. Flexibility/Adaptation	30. Achievement Emphasis

Source: Campbell (1977, pp. 36-39)

Collectively, it can be said that although there is only a rudimentary understanding of what is actually involved in or what constitutes the concept of organisational effectiveness (Steers 1975), several effectiveness models, each with its own distinctive set of OE measures, have been developed and conceptualised by researchers. These models are mainly classified under two main approaches; namely unidimensional (or univariate) approaches (i.e. with single measures) and multidimensional (or multivariate) approaches (i.e. with multiple measures) of organisational effectiveness<sup>11</sup>.

<sup>11</sup> These are the principal approaches to OE, and the distinction between OE models is primarily based on these two approaches. However, some scholars, like Zammuto (1982), have classified the OE models into three categories and labelled them as “whose values” (e.g. goal attainment models), “value-free” (e.g. systems models), and “multiple values” (i.e. multiple constituency models) approaches.

## 2.1. Unidimensional OE Approaches

Early approaches to organisational effectiveness generally focused on a single criterion of organisational success to define and assess effectiveness. The single criterion is normally representing the organisational goal (e.g. profitability). Examples of single measures of OE can be found in Table 4.1 above, where each criterion could individually be utilised as a model to assess the organisational effectiveness. However, the utility of univariate approaches is questionable, because some of these criteria are not adequate measures of effectiveness (e.g. productivity may be efficient but not effective); some measures represent researcher values rather than “objective” measures; and univariate criteria may not contribute to an understanding of an overall effectiveness construct (Kraft & Jauch 1992). Therefore, with respect to the inappropriateness of single criterion models of OE, Steers (1977, p. 42) suggests that:

...most univariate models of organisational effectiveness suffer from a form of empirical myopia. As such they contribute little toward building effectiveness models or making meaningful recommendations to managers concerning ways to improve effectiveness.

As a single criterion OE model (or even a multivariate model) may contain an organisational goal to assess OE, the concept of these goals and goal-achievement models will be elaborated in the following sections.

## 2.2. Multidimensional OE Approaches

Although there is little consensus as to what constitutes a valid set of effectiveness criteria (Katz & Kahn 1978; Cameron 1986), there seems to be a general consensus that organisational effectiveness should be studied from a multidimensional perspective (Connolly et al. 1980; Goodman & Pennings 1980; Cameron 1986). In fact, the absence of consensual criteria has served as one of the major factors that led to the development of multivariate models of organisational effectiveness (Cameron & Whetten 1983a). This has gradually become a common belief among the researchers that organisations must identify multiple domains of effectiveness and that a multitude of effectiveness criteria measures is needed for a more comprehensive evaluation of organisations

(Cameron 1981a, 1986; Hitt 1988). With respect to the advantages of these models over unidimensional models, Steers (1977, p. 42) explains:

A more meaningful approach to examining the role of effectiveness in organisations consists of model-building attempts...These models have a distinct advantage over univariate techniques in that they generally represent attempts to study in a more comprehensive fashion the major sets of variables involved in the effectiveness construct and to demonstrate or at least suggest how such variables fit together.

Upon the introduction of these models, many different multidimensional OE approaches have emerged from different conceptualisations of the meaning of an organisation. However, with few exceptions, only three approaches to defining and assessing OE from a multivariate perspective have received particular attention (Zammuto 1982). These are the “goal model”, “systems model”, and “multiple constituency model”. Each of these models has certain advantages and disadvantages. But, a critically important factor that can determine which model is most appropriate in assessing organisational effectiveness is the domain of activity in which the organisation is operating (Cameron 1981a). Each of these models will be discussed individually in the following subsections.

### **2.2.1. Goal Achievement Models**

The first and the earliest approach to OE is the “goal model”. The concept of organisational goals is one of the most complex and controversial topics in organisation theory (Scott 1977). Consequently, the major contributor to the controversial concept of organisational effectiveness appears to be the fact that organisational effectiveness has come to be regarded by many as synonymous with goal-attainment (Reimann 1975).

As mentioned earlier, there is little consistent agreement in the literature with regard to the factors that predict high or low effectiveness of an organisation. However, goal-attainment has indeed served as the traditional approach to measuring the organisational effectiveness, and the use of the goal model has attracted most attention as the main predictor of organisational effectiveness. This approach measures the effectiveness of an organisation in terms of its ability to meet and exceeds its objectives. The goal-achievement model is considered an objective and reliable analytical tool because it

omits the values of the explorer and applies the values of the subject under study as the criteria of judgement (Etzioni 1960).

The goal-achievement approach is based on the fact that organisations are rational and goal-seeking entities and accomplishing goal(s) becomes an appropriate measure of their effectiveness. Therefore, goal-seeking criteria can be utilised as a decision-makers' tool for evaluating the organisational effectiveness. In this regard, Campbell (1977, p. 19) suggests:

The goal-centred view makes a reasonably explicit assumption that the organisation is in the hands of a rational set of decision makers who have in mind a set of goals that they wish to pursue. Further, these goals are few enough in number to be manageable and can be thus understood.

The effort of Price (1968) to draw a standard measure of organisational effectiveness from 50 empirical studies illustrates the early popularity of the goal model. On the importance of the goal-achievement model, Forbes (1998, p. 186) also states that 'goal-attainment researchers sought to identify objective measures that corresponded to organisations' goals and used those measures as more or less direct indicators of organisational effectiveness'.

As expressed so far, one prominent way of defining effectiveness is in terms of the goals of the organisation. But this simple approach to organisational effectiveness poses a number of legitimate obstacles that make it difficult to utilise them (Perrow 1970; Reimann 1975; Pfeffer 1977; McGowan, Spagnola & Brannan 1993; Robbins & Barnwell 1994; Smith 1998), including:

- Whose goals? Organisation's? Management's? Employees'?
- Which goals? Short-term or long-term goals?
- How do we accommodate interdivisional comparisons where common objectives may not apply?
- How do we measure qualitative or intangible success factors? (e.g. technological competence, learning, corporate culture and employee morale);
- There are multiple and often conflicting goals in organisations. So, how do we allocate relative importance to goals that may be incompatible and represent diverse



interests? (i.e. “high product quality” and “low unit cost”). This is, prioritising measures of organisational effectiveness;

- In some cases, goals may merely be rationalisations to explain past actions rather than guides to future actions. Organisations act first, then later create a goal to justify what has happened. In other words, goals are better understood not as prescriptions for the future but as explanations of the past;
- How do we distinguish between a goal and a means? What one observer calls a goal, another may equally well designate as a means towards some higher or more general goals;
- Goals are frequently unspecified and possibly unspecifiable;
- Goals involve a time dimension, and the specification of this dimension may be critical;
- Goals may be defined with respect to individual actors or their interests within the organisation, such as the goal of maintaining power or acquiring resources;
- Most organisations are generally seeking to accomplish several different goals at the same time, and the accomplishment of one of these goals often may inhibit the realisation of another. Therefore, the goal model of effectiveness raises the possibility that an organisation really cannot be effective if it means attainment of all or even most of its goals; and
- The last but not the least, difficulty with the goal model is that it has limited use for comparing the relative effectiveness of different organisations, since their salient goals may differ substantially.

### 2.2.2. Systems Models

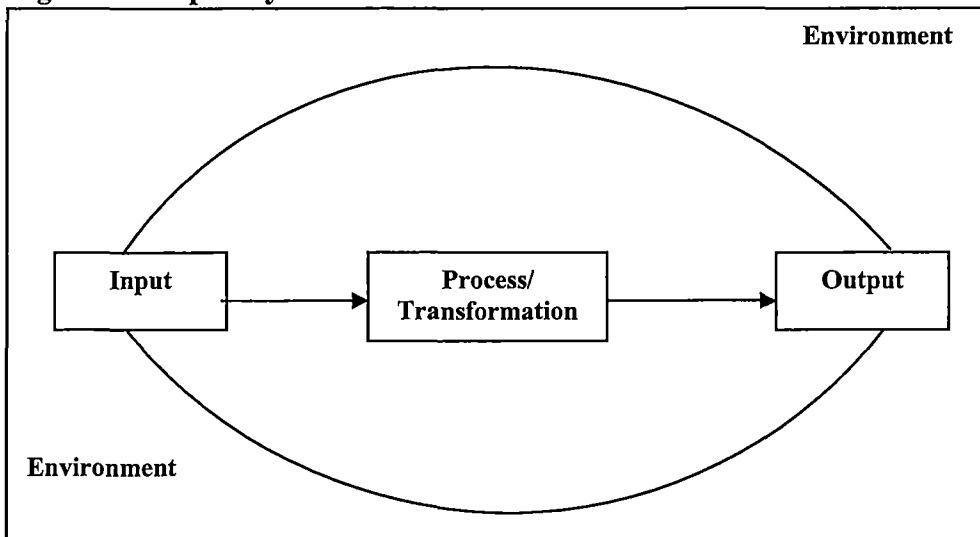
The second approach is the “systems model”, which is an alternative to the goal model and is created based on organisational functions. The emergence of a systems approach to OE is considered to be a major milestone in OE research. As the systems view has revolutionised studies of organisational effectiveness and become a base for the development of later OE models, such as resource acquisition models and process models, its principles need to be explored.

A system may be defined as an orderly grouping of separate but interdependent components (sub-systems) for the purpose of attaining some predetermined objectives.

Each component or sub-system can be a system in its own right. Systems should be designed in such a way to maintain long-term survival, viability and existence as well as short-term objectives.

Systems take inputs, transform them, and produce some output. They are classified as either closed or open. Since the closed system ignores the effect of the environment, it is not applicable to organisations. But, the open system recognises the dynamic interaction of the system with its environment (Robbins & Barnwell 1994), so all organisations can be described using an open system framework. This framework emphasises the distinctiveness of the organisation as an identifiable social structure or entity, and it emphasises the interdependency processes that relate the organisation to its environment (Yachtman & Seashore 1967). A simplified and generic graphical presentation of the open system is illustrated in Figure 4.1.

**Figure 4.1: Open Systems**



Source: Adapted from Robbins and Barnwell (1994)

Bearing this in mind, organisational effectiveness can, as an alternative to goal achievement approach, be assessed through a systems approach where organisations acquire inputs (resources), process them, and produce outputs. As the definition of a system suggests, these three processes (input, transformation, and output) are tightly interrelated, and so the organisational effectiveness can be assessed at any point in the loop (Connolly et al. 1980). The systems model, an application of open system theory

for evaluation, views the interdependence of the various roles in an organisation in the form of input/output transactions.

Furthermore, organisation as an open system, in order to survive, must be able to fulfil certain basic needs such as (Cunningham 1978):

- The organisation's ability to search out and respond to properties of the external environment;
- The organisation's ability to use its resources to produce outputs and to maintain and restore the systems;
- The organisation's ability to bargain and optimise its use of resources in an environment with a number of decision-makers, each with a different objective.

These abilities can be used to evaluate the effectiveness of organisations. That is, assessing the effectiveness of a particular organisation in terms of its ability to meet the requirements arising from its situations. This suggests that OE can also be assessed by a system resource approach. That is, the system resource approach defines effectiveness as viability or survival, and measures the organisational effectiveness with reference to the organisations' ability to exploit resources from their environment (Forbes 1998).

The early researchers on utilisation of the "system resource approach" were Yachtman and Seashore (1967, p. 898) who viewed organisational effectiveness as the 'ability of the organisation, in either relative or absolute terms, to exploit its environment in the acquisition of scarce and valued resources'. According to this approach, the greater the ability of the organisation to exploit its environment, the greater its effectiveness.

Campbell (1977) has another view of the systems approach (which he calls the "natural system view") to organisational effectiveness, and attempts to make a comparison between goal-achievement and system approaches. Campbell (1977, p. 21) states:

...the analyst [of systems approach] would make inquiries about such things as the degree of conflict among work groups, the nature of communications, the level of racial tension, the percentage of jobs that were filled by people with the appropriate skill levels, the job satisfaction of the employees, and the like. At the outset, the consultant would not be concerned with the specific tasks [goals] the organisation was trying to perform but with the overall viability and strength of the system.

Etzioni (1960) suggests that the goal model is less objective than it appears to be and the systems model not only seems to be a better model but also seems to supply a safety measure against a common bias, the Utopian approach to social change. The main advantage of the systems approach over the goal-attainment approach lies with its concentration on the means (not ends) necessary to ensure the organisation's continued survival, whereas the goal-achievement approach mainly focuses on outputs (Robbins & Barnwell 1994). Furthermore, those who use the systems approach usually criticise the goal approach by claiming that if the goals of an organisation cannot be identified, then the effectiveness cannot be measured.

There are different models of the systems approach in the literature, and each tries to establish a number of variables (in the system) that are affecting the organisational effectiveness, and ultimately utilises these variables to measure organisational effectiveness. These models will be reviewed in detail in later sections.

### **2.2.3. Multiple Constituency Models**

The third approach is the "multiple constituency" or "participant satisfaction" model of organisational effectiveness. Organisational effectiveness is considered from multiple points of view and allows multiple evaluations from multiple constituencies. In this approach, the effectiveness is defined in terms of the degree to which the needs and expectations of strategic constituencies are met by the organisation (Keeley 1978). Therefore, the criteria used in judging organisational effectiveness in multiple constituency models reflect the nature of constituent interactions with the organisation (Zammuto 1982). This approach to effectiveness treats both goal and systems models as valuable, though partial, insights into linkages between the organisation's activities and constituencies (Connolly et al. 1980).

All multiple constituency models that exist in the literature attempt to 'develop an understanding of the nature of organisational effectiveness within the multiple constituency framework and explore the concept's implications for organisational decision making' (Zammuto 1982, p. 39). Multiple constituency models that are relevant to this research will be reviewed in the following section.

#### **2.2.4. Review of Multidimensional OE Models**

As stated at the outset, there is no model designed and developed for the assessment of OE in seaport organisations. Therefore, one of the main objectives of this chapter is to develop a list or a menu of OE criteria through in-depth examination of the existing relevant models of OE developed for other organisations. This is a preliminary step for building an appropriate model for OE assessment in seaport organisations.

The methodology adopted for this review is based upon four guidelines. First, this review focuses exclusively on theoretical as well as empirical research. Second, the time frame chosen for this review is from 1952 (the scientific emergence of OE) to 2004 (prior to conducting the current research questionnaire survey). Third, this review includes only those influential and topical articles that were published in leading academic journals (e.g. Academy of Management Journal, Administrative Science Quarterly, Academy of Management Review, etc.) and those published as book chapters. Fourth, as much as possible, this review concentrates only on those models of effectiveness that either were designed for OE assessment in any of the service industry organisations or were claimed to be applicable to all types of organisations.

Of all the journal articles and book chapters reviewed (i.e.112), 49 models satisfied the above guidelines for inclusion in the review. These 49 models are listed in Table 4.2, followed by their description. Some of these models have used the same underlying concepts to explain OE and develop OE criteria, thus not all 49 models are described. That is, although all the criteria from these 49 models are extracted, a brief description of some of the most influential and popular models is presented.

**Table 4.2: OE Models**

	<b>Year</b>	<b>Model</b>		<b>Year</b>	<b>Model</b>
<b>1</b>	1952	Bass	<b>26</b>	1977	Kirchhoff
<b>2</b>	1957	Georgopoulos & Tannenbaum	<b>27</b>	1977	Scott
<b>3</b>	1960	Etzioni	<b>28</b>	1977	Pennings & Goodman
<b>4</b>	1962	Bennis	<b>29</b>	1977	Cummings
<b>5</b>	1966	Katz & Kahn	<b>30</b>	1977	Weick
<b>6</b>	1967	England	<b>31</b>	1978	Cunningham
<b>7</b>	1967	Yuchtman & Seashore	<b>32</b>	1980	Glisson & Martin
<b>8</b>	1968	Price	<b>33</b>	1980	Connolly, Conlon & Deutsch
<b>9</b>	1968	Friedlander & Pickle	<b>34</b>	1981	Rohrbaugh
<b>10</b>	1969	Mahoney & Weitzel (1)	<b>35</b>	1981	Cameron & Whetten
<b>11</b>	1969	Mahoney & Weitzel (2)	<b>36</b>	1983	Gaertner & Ramnarayan
<b>12</b>	1971	Ghorpade	<b>37</b>	1983	Quinn & Cameron (1)
<b>13</b>	1972	Mott	<b>38</b>	1983	Quinn & Cameron (2)
<b>14</b>	1973	Pugh & Pheysey	<b>39</b>	1983	Quinn & Cameron (3)
<b>15</b>	1973	Khandwalla	<b>40</b>	1983	Quinn & Cameron (4)
<b>16</b>	1973	Duncan	<b>41</b>	1983	Weick & Daft
<b>17</b>	1974	Webb	<b>42</b>	1983	Quinn & Rohrbaugh (1)
<b>18</b>	1975	Child	<b>43</b>	1983	Quinn & Rohrbaugh (2)
<b>19</b>	1975	Reimann	<b>44</b>	1983	Quinn & Rohrbaugh (3)
<b>20</b>	1976	Steers	<b>45</b>	1983	Quinn & Rohrbaugh (4)
<b>21</b>	1976	Evan	<b>46</b>	1986	Cameron
<b>22</b>	1976	Price	<b>47</b>	1987	Smith & Gannon
<b>23</b>	1976	Stewart	<b>48</b>	1993	Ridley & Mendoza
<b>24</b>	1976	Srivasta & Salipante	<b>49</b>	1996	Thibodeaux & Favilla
<b>25</b>	1976	Kilmann & Herden			

#### 2.2.4.1. Bass Model

Bass (1952) was one of the earliest advocates of expanding the conceptualisation of OE. Bass (1952) believes that traditional effectiveness indexes like productivity or profit are not sufficiently broad for evaluating the success of an organisation. Instead, an organisation's effectiveness should also reflect the worth of the organisation to its individual members and the worth of both individual members and the organisation to society. Specifically, an organisation should be evaluated in terms of:

- the degree to which it is productive, profitable, and self-maintaining
- the degree to which it is of value to its members
- the degree to which it and its members are of value to society

He further urges that these have become recognised criteria of organisational effectiveness, as substantiated by facts. For example, he notes that federal and state worker-safety and anti trust laws assume that an organisation's worth to the individual and to society are both important effectiveness criteria.

In summary, Bass (1952) proposed his three criteria (in the early 1950s) in measuring an organisation's effectiveness not just in terms of productivity, but also in terms of the organisation's worth to its individual members and to society as a whole.

#### **2.2.4.2. Georgopoulos and Tannenbaum Model (1957)**

This model is one of the few studies that explicitly distinguishes between the goal and systems approaches to the study of organisational effectiveness. The approach of Georgopoulos and Tannenbaum (1957) to organisational effectiveness was multidimensional and based on organisational ends and means. They claim that productivity, flexibility in terms of internal and external adaptations, and absence of tension and conflict within subgroups are dimensions of effectiveness and have applicability to most organisations. To support the idea of "means versus ends" in developing their model and its indicators for measuring organisation effectiveness, they assumed (p. 179):

...all organisations attempt to achieve certain objectives and to develop group products through the manipulation of given animate and inanimate facilities. Accordingly, definitions of organisational effectiveness must take into consideration these two aspects: the objectives of organisations [ends, goals] and the means [planning] through which they sustain themselves and attain their objectives, particularly those means that usually become functionally autonomous (i.e., that come to assume the character of and function as organisational goals). In short, the study of organisational effectiveness must contend with the question of organisational means and ends.

The transitory nature of many of the effectiveness measures has led these researchers to argue that flexibility in the face of change is or ought to be, a defining characteristic of organisational effectiveness.

These researchers observed (about 50 years ago) that the common practice of effectiveness assessment by univariate indicators such as productivity or profit was

inconsistent with the broad meaning attached to effectiveness in the organisation literature. They have criticised the univariate approach and insisted that effectiveness constructs have to be multidimensional in nature (systems approach). They viewed organisational effectiveness within a systems framework and maintained the idea that effectiveness could be better understood jointly in terms of productivity, flexibility, and the absence of intraorganisational strain. In this regard, they state (p. 180):

We define organisational effectiveness as the extent to which an organisation as a social system, given certain resources and means, fulfils its objectives without incapacitating its means and resources and without placing undue strain upon its members. This conception of effectiveness subsumes the following general criteria: (1) organisational productivity; (2) organisational flexibility...and (3) absence of intraorganisational strain, or tension, and of conflict between organisational subgroups.

Georgopoulos and Tannenbaum (1957, p180) also propose a generalised model when they argue that their three evaluation criteria 'potentially apply to nearly all organisations'. Zammuto (1982, pp. 33-34) praises this model by stating:

The first major article employing a "value-free" model was published in 1957 by Georgopoulos and Tannenbaum in a study of the effectiveness of an industrial service organisation. They created a model of organisational effectiveness based on organisational functions, as opposed to organisational goals, with two explicit purposes: (1) to avoid the "whose values" dilemma and (2) to construct a model applicable to all organisations.

#### **2.2.4.3. Bennis Model (1962)**

The Bennis (1962) model, in comparison with the other models, deals with a different perspective of organisational effectiveness. He (p. 3) argues that:

...researchers on organisations—particularly industrial organisation—have struggled heroically to identify and measure a number of dimensions associated with organisational effectiveness. Generally these dimensions have been of two kinds: those dealing with some index of organisational performance, such as profit, cost, rates of productivity, or individual output, and those associated with the human resources, such as morale, motivation, mental health, job commitment, cohesiveness, or attitudes toward employer or company.



He criticises the extant models and refers to “inadequacy of criterion variables for the modern organisation” by stating (p. 7):

The present ways of thinking about and measuring organisational effectiveness are seriously inadequate and often misleading. These criteria are insensitive to the important needs of the organisation and out of joint with the emerging view of contemporary organisations that is held by many organisational theorists and practitioners.

Bennis (1962) believes that the basic flaw in the present effectiveness criteria is the inattention to the problem of adapting to change. He suggests that if we view organisations as adaptive, problem-solving, organic structures, then inferences about effectiveness have to be made, not from static measures of output, but on the basis of the processes through which the organisation approaches the problems. In other words, no single criteria of measurement can provide valid indicators of organisational effectiveness.

In his view the main challenge confronting today’s organisation is that of responding to changing conditions and adapting to external stress. According to Bennis (1962), the “methodological rules” and problem-solving techniques that an organisation uses are the critical determinants of its effectiveness. These rules and procedures closely resemble the rules of inquiry that are an implicit part of scientific investigation.

In summary, Bennis’ argument is that the most crucial problem facing organisations is to survive and adapt in a changing environment, and for them to do so, an open, scientific spirit of inquiry must prevail in the organisation. Thus, in his opinion, adaptability—an ability to clearly identify the organisational identity, and the capability for reality testing—for correctly identifying problems and their solutions, are the major criteria of organisational effectiveness.

#### **2.2.4.4. Katz and Kahn Model (1966, 1978)**

This model has been one of the most influential models of organisational effectiveness. In the 1960s and 1970s, Katz and Kahn (1966) viewed organisations as an open system and produced a model of organisational effectiveness based on the characteristics of

open systems. They developed and employed a multidimensional approach with the ability to measure organisational effectiveness of system-based organisations.

Katz and Kahn's (1966) version of the systems model is widely cited in the literature and gained wide acceptance, as it truly represents the use of a systems approach in the study of organisational effectiveness. Pennings and Goodman (1977, p. 175) believe 'analysis for Katz and Kahn is at the organisational level. Their discussion of alternative levels of analysis is one of the best in the literature on organisational effectiveness'.

In developing criteria of organisational effectiveness, they (p.150) note that 'the existence of the problem of developing satisfactory criteria of organisational performance is clear enough; its solution is much less obvious'. Katz and Kahn (1966) define effectiveness in terms of two components; efficiency and political effectiveness. That is, the greater the efficiency and political effectiveness, the greater will be the organisational effectiveness. They (p. 170) refer to efficiency 'as the ratio of energetic output to energetic input'. They believe that human organisations take in energy in forms of people, as energy sources, and materials that already contain the energetic investments. Further, they try to broaden the concept of efficiency as it contributes to organisational effectiveness. They (p. 155) state that 'the efficiency ratio tells us how well the organisation utilises the energy at its disposal, how much energetic investment in all forms (labour, supplies, power, and the like) is required for each unit of output'.

They define the political component of organisational effectiveness as (p. 165):

Political effectiveness, then, consists, in the short run, of maximising the return to the organisation by means of advantageous transactions with various outside agencies and groups, and with the members of the organisation as well. Like efficiency, political effectiveness contributes to the immediate profitability of the enterprise and to its growth and survival power for the long term. It leads also to increased control over the organisational environment....

Katz and Kahn's view of an organisation as an open system transacting with its environment is accepted by most of OE researchers. For example, Pennings and Goodman's (1977, p. 175) version of organisational effectiveness also sees the organisation as an open system, however they believe that 'the Katz and Kahn view does not elaborate on many other determinants of effectiveness, such as those related

with subsystem behaviour and the interplay of external actors'. Further, Pennings and Goodman (1977) criticise the description and role of organisation environment provided in the Katz and Kahn model. They (p. 175) reveal that:

Although the concept of political effectiveness clearly recognises the importance of the environment, in Katz and Kahn's view of effectiveness, there is surprisingly little delineation of the nature of the organisation's environment and how it interacts with the organisation.

Nord (1983) also does not fully agree with the multiple constituency approach developed by Katz and Kahn. Nord (1983, p. 97) argues:

They recognised the multiple constituency argument but sought to deal with it by defining the goals of external constituents as constraints and then concluding that "organisational effectiveness consists of maximisation within these constraints". This approach is less satisfactory because in essence it "solves" the value problem by moving it outside the boundary of organisational theory.

In summary, Katz and Kahn (1966) believe that the definition of organisational effectiveness depends on the perspective of the individual or constituent group defining it. It simply means that each person or constituent group within or outside of an organisation may have different and sometimes conflicting definitions of OE (Ridley & Mendoza 1993). Katz and Kahn's model provides a multi-criteria approach for measuring organisational effectiveness from the point of view of the organisation. These criteria are identified as storage (of energy), growth, survival, and control over the environment.

#### **2.2.4.5. Yuchtman and Seashore Model (1967)**

Yachtman and Seashore (1967) claim that the traditional approach to organisational effectiveness can be divided into the following two assumptions:

- Complex organisations have an ultimate goal toward which they are striving;
- The ultimate goal can be identified empirically and progress toward it measured.

Beyond these two common assumptions, however, they introduce their own two major doctrines with regard to rationale and operations for identifying the goals of organisations. These are:

- “Prescribed goal approach” (or simply “goal approach”) which is characterised by a focus on the formal character of the organisation, or on some category of its personnel (usually its top management) as the most valid source of information concerning organisational goals.
- “Derived goal approach” (or “functional approach”) in which the investigator derives the ultimate goal of the organisation from his (functional) theory, thus arriving at goals which may be independent of the intentions and awareness of the members.

In their assessment of the first approach (goal), they (p. 895) conclude that ‘this is not to suggest that the concept of organisational goals should be rejected *in toto*...in the study of organisational effectiveness, however, the goal approach has appeared as a hindrance rather than as a help’. Further, they (p. 897) urge that ‘the goal approach, while adhering to an organisational frame of reference, has failed to provide a rationale for the empirical identification of goals as an organisational property’.

In their evaluation of the second approach (functional), they (p. 897) reach an almost similar conclusion and state that ‘the functional approach...has no difficulty in identifying the ultimate goal of the organisation..., but the functional model does not take the organisation as the frame of reference’. Finally, they suggest that neither of the two approaches gives adequate consideration to the conceptual problem of the relations between the organisation and its environment.

While totally abandoning the goal and functional approaches to organisational effectiveness, and the idea of seeking to attain any single goal, they see the organisation as an open system and view organisational effectiveness in terms of how successful the organisation is at acquiring “*scarce and valued resources*”. They (p. 900) define resources as follows:

Resources are (more or less) generalised means, or facilities, that are potentially controllable by social organisations and that are potentially useable-however indirectly-in relationships between the organisation and its environment.

As a result, they (p. 898) define organisational effectiveness in terms of “bargaining position”, and state that:

The concept of “bargaining position” implies the exclusion of any specific goal (or function) as the ultimate criterion of organisational effectiveness. Instead it points to the more general capability of the organisation as a resource-getting system.

According to these writers, by focusing on the ability of the organisation to exploit its environment in the acquisition of resources we are directed by the basic yet often neglected fact that it is only in the arena of competition over scarce and valued resources that the performance of both like and unlike organisations can be assessed and evaluated comparatively. Or simply, any change in the relation between the organisation and its environment is affected by and results in a better or worse bargaining position vis-à-vis that environment or parts thereof.

#### **2.2.4.6. Friedlander and Pickle Model (1968)**

A fundamental question for (or more appropriately, a major trouble with) the study of organisational effectiveness is “the criteria of organisational effectiveness from whose points of view?”. This model effectively answers this question by inferring that “depending on whom one asks, a different set is identified” (Friedlander & Pickle 1968). This is simply to say that the multiplicity of outputs produced by the organisation results in their being differently valued by different constituencies of the organisation (Gaertner & Ramnarayan 1983). So, from different perspectives different views are obtained.

Friedlander and Pickle (1968) have empirically studied organisational effectiveness criteria important to different constituencies of ninety-seven small businesses. They developed a different set of effectiveness criteria to identify outcomes of importance to owners, employees, customers, suppliers, creditors, community, and the government. They assume that firms are engaged in exchange relationships with different segments

of their environment and that the degree to which these relationships are satisfied is crucial to organisational stability and growth.

Friedlander and Pickle (1968, p. 192) assert that the model is based on organisation system approach 'to explore the concept of total organisational effectiveness by studying the relationships between internal and external system effectiveness'. Although they view the organisation as a system, but unlike Katz and Kahn (1966) and Seashore and Yachtman (1967)—who suggest that the effectiveness construct is best understood in terms of the entire organisational system (continuously trying to reach or maintain homeostasis with respect to its internal and external environments), Friedlander and Pickle (1968) conceptualise that once an organisation acquires certain defining characteristics it becomes effective.

In selection of effectiveness criteria for their model, Friedlander and Pickle (1968, p. 192) emphasise:

Clearly, effectiveness criteria must take into account the profitability of the organisation, the degree to which it satisfies its members, and the degree to which it is of value to the larger society of which it is a part. These three perspectives include system maintenance and growth, sub-system fulfilment, and environmental fulfilment. Each is obviously composed of several related components, and each component is hypothetically related to the other.

The trend of their research illustrates that the model is designed to reflect profitability for owners, satisfaction for employees, and societal value for society at large. In other words, this model shows that the selection of appropriate evaluation criteria is a function at least in part of who is doing the evaluating and their particular frame of reference (Steers 1975).

By taking the various stakeholders' views into consideration to measure organisational effectiveness, Friedlander and Pickle (1968) found very weak correlations among various stakeholders' judgements about effectiveness and suggest that stakeholders' interests do not compete directly, so that it is possible to satisfy one type of stakeholder without dissatisfying others. Because of these relatively low and sometimes negative correlations between effectiveness scores across a set of criteria of presumed importance to different stakeholders (owners, employees, creditors, suppliers,

customers, governmental regulators, and the host community), Friedlander and Pickle (1968, p. 199) conclude that 'evidently, organisations find it difficult to fulfil simultaneously the variety of demands made upon them'.

In summary this model consists of three variables or indicators of organisational effectiveness namely; profitability, employee satisfaction, and societal value. The model assesses these three indicators from the stakeholders' points of view for small business firms.

#### **2.2.4.7. Mahoney and Weitzel Model (1969)**

Unlike other models of organisational effectiveness, Mahoney and Weitzel (1969) conducted an inductive approach to organisational effectiveness. They used quantitative techniques to derive empirically the relevant effectiveness criteria based on studies carried out by themselves (Steers 1975, 1977). In contrast, other models of organisational effectiveness mainly utilised a deductive approach. That is, the evaluation criteria were set forth by definition or as a result of proposed theory, and then potential determinants or outcomes were examined.

Mahoney and Weitzel (1969) carried out a study on the effectiveness of general business organisations and of research and development organisations. They examined 283 organisation units of 13 companies and 103 research and development organisational units in 4 companies. The two models derived are managerial models of organisational effectiveness as the researchers asked 84 general business managers and 32 research and development managers to rate their OE criteria preferences. Their findings, that formed two models of effectiveness, are shown in Table 4.3 and Figure 4.2.

The Mahoney and Weitzel (1969) findings indicate significant divergence in the criteria used to evaluate the performance of the two types of organisations. They (p. 362) suggest that:

General business managers tend to use productivity and efficient performance as close substitutes for the ultimate criterion of effectiveness...The research and

development managers, on the other hand, use cooperative behaviour, staff development, and reliable performance as high order criteria.

These models question the generalisability and applicability of OE models and answer the question concerning how widely one can generalise the selected evaluation criteria to other organisations. Mahoney and Weitzel (1969, p. 364) conclude:

Research findings of studies using a global criterion of effectiveness in varied settings often are confusing, probably because of variation in the composition of the implicit set of criterion dimensions applied. The various dimensions of organisational effectiveness identified in this research [managerial models], if used as multiple criteria in place of a global criterion, may yield more conclusive findings, which the manager might utilise as appropriate to his concept of organisational effectiveness.

It is notable that Mahoney and Weitzel developed the models of effectiveness based on their study and never claimed that these models should be applied to all organisations. Finally, Steers (1975, p. 554) supports this idea and states ‘the assumption that one model is equally applicable to all organisations may, in the absence of empirical support, lose sight of the functional specialisation or environmental variations across a diverse set of organisational entities’.

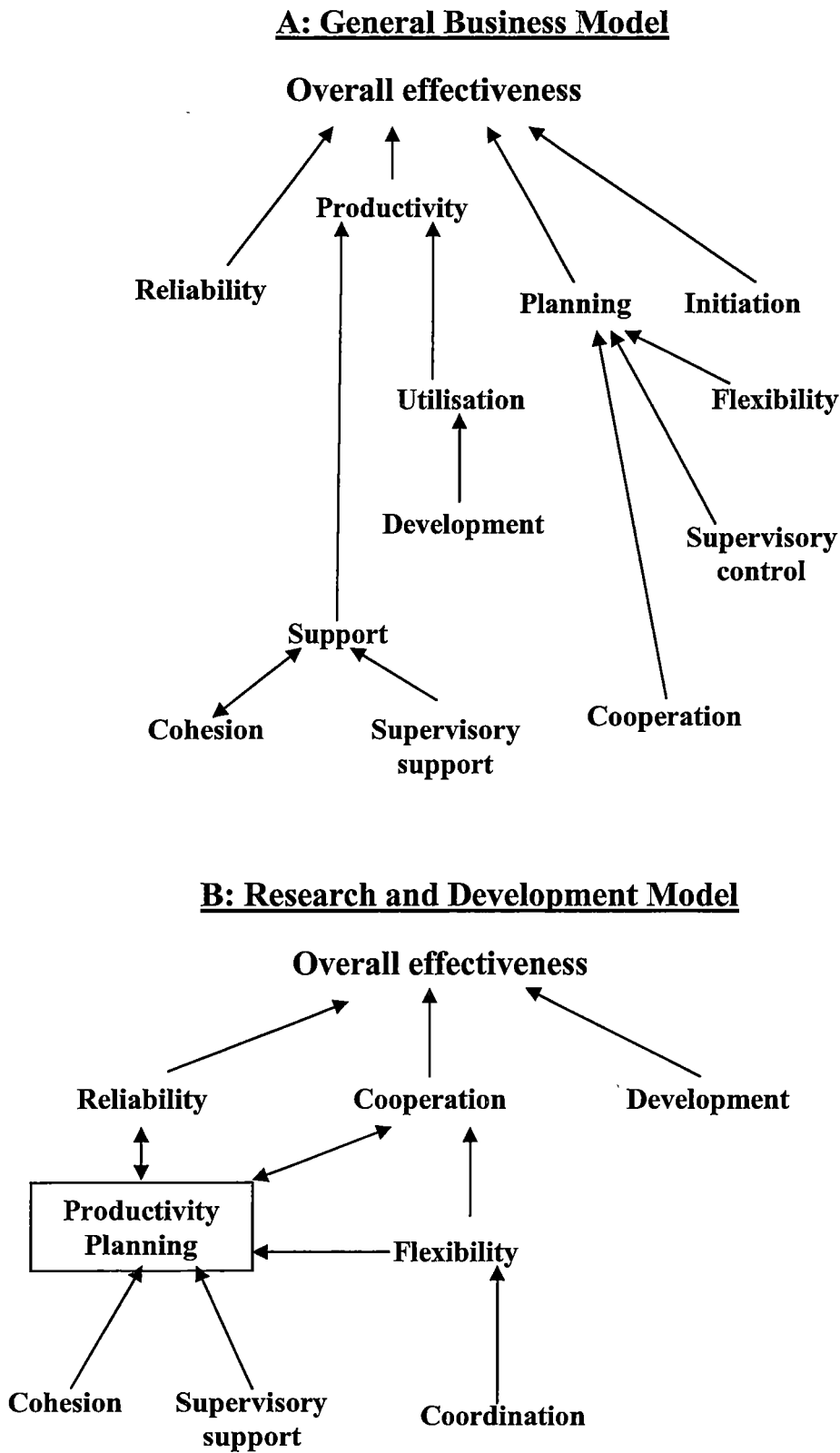
Table 4.3: General business and research and development models

General Business Model Criteria	Research and Development Model Criteria
Productivity-support-utilisation Planning Reliability Initiative	Reliability Cooperation Development

Source: Adapted from Mahoney & Weitzel (1969)



Figure 4.2: Relationships of OE criteria to overall effectiveness in (A) General Business Model and (B) Research and Development Model



Source: Mahoney and Weitzel (1969, p. 359)

#### 2.2.4.8. Mott Model (1972)

Mott (1972) views organisations as open and power systems. Mott (1972, p. 178) defines organisational effectiveness as ‘the relative ability of the members of an organisation to mobilise their centres of power to produce [productivity], adapt [adaptability], and handle [flexibility] temporally unpredictable overloads of work’. It is clear that the model abandons the goal attainment approach to OE and tries to be as free of goal orientation as possible as it only intends to measure the effectiveness of the actual work process. In this regard, Mott (1972, p. 178) states that ‘it [OE model] avoids the arbitrariness of selecting managerial goals or those found in corporate charters as frames of reference; goals that may be vague, not universally accepted, or simply mask the real objectives of the organisation’.

Mott (1972, p. 19) chooses productivity and adaptability for his model because he believes that ‘effective organisations are those that produce more and higher-quality outputs and adapt more effectively to environmental and internal problems than do other, similar organisations’. Furthermore, the selection of flexibility, as the last measure of organisational effectiveness in this model, is justified and based on the systems theory perspective. As an open system is subjected to changes from the external environment, the members should have the ability to accept and cope with changes. Mott (1972, p. 19) defines flexibility as ‘organisational ability to adjust its centres of power quickly to cope with temporally unpredictable overloads of work that require significant but temporary modifications of roles by affected members’.

This multidimensional model is a deductive approach to evaluate organisational effectiveness as the criteria identification is followed by empirical work (Steers 1975). Later the model was put into practice and tended to measure members’ perceptions of the effectiveness of an organisation (hospitals and governmental agencies). Mott (1972, p. 180) concludes ‘all three survival processes—productivity, adaptability, and flexibility—can be structured to varying degrees, and the degree affects the organisational characteristics associated with them’.

#### 2.2.4.9. Duncan Model (1973)

Systems theory is employed in this model of organisational effectiveness. The model endeavours to identify processes by which organisations adapt to their environment, and the relationship between these adaptation processes and organisational effectiveness (Duncan 1973). The model emphasises the role of the organisation's environment (internal and external) and assesses how the organisational structure should cope with different environmental conditions. In this regard, Duncan (1973, p. 274) declares that the objective of this model is 'to identify the types of structural modification decision units implemented in making decisions under [environmental] uncertainty, and the relationship of these structural modifications with organisational effectiveness'.

In this model 'the unit of analysis for organisational effectiveness will be organisational decision units...[and] organisational effectiveness will be conceptualised as having three components' (Duncan 1973, p. 274). The components chosen for this model are those that are crucial for viability and existence of any organisation. These are: goal achievement, integration, and adaptation. The selection of these OE criteria is justified by Duncan (1973, p. 275) as:

What is being emphasised here in assessing the effectiveness of a social system, whether it be a total organisation or a specific decision unit, is that the concept of effectiveness must consider three interrelated dimensions: *first*, the extent to which the system is attaining its formally defined goals and objectives [goal achievement]; *second*, how completely members are being integrated into the system through clearly defined roles [integration]; *third*, the extent to which the system is adapting structurally to its environment so that role occupants can adapt to new demands, resulting from a changing environment, on their jobs [adaptation].

#### 2.2.4.10. Child Model (1974, 1975)

The complexity of the problem of what determines the levels of performance has led Child (1974, p. 175) to theorise that there are many different theoretical propositions for the determinants of performance in organisations, and to categorise them under two headings:

The first may be called universalistic theory because it comprises arguments that the presence of certain attributes will, of itself, be conducive to superior

performance in most, if not all, circumstances. The second approach, usually called contingency theory, contains propositions that the attributes favourable to higher performance will alter according to the circumstances under which a company is operating.

This statement reveals that universalistic models purport to set forth evaluation criteria that can be generalised to all organisations, and contingent models, however, have narrowed their applicability and focused instead on one type of organisation, and thus effectiveness criteria are believed to be contingent upon the type of organisation under study (Steers 1975, 1977). Since this model tries to discover the performance measures of 82 British companies in six different industries, Child (1974, 1975) uses both, universalistic and contingency, approaches to measure organisational effectiveness.

Before deciding on the components of OE model, Child (1974, pp. 177-178) raises some important questions and suggests that:

An assessment of performance has to be made against some set of criteria. It therefore depends upon assumptions as to the legitimacy and priority of alternative objectives. Whose interests do we think a company, or any type of institution for that matter should serve, in what degree and by what means? For whom should we therefore be assessing the costs and benefits of the company's operations?

This model of organisational effectiveness assesses the performance by the financial criteria of profitability and growth, and ignores the wider social issues concerning the costs to the community of financial success (Child 1974). No clear reason has been presented to justify the selection of these two criteria, but an implicit explanation can be drawn; that is, because the companies under study are all business organisations, and thus, these two indicators (profitability and growth) can best serve the purpose of performance measurement in these organisations.

After conducting a survey, Child (1975, p. 25) concludes that 'research into the performance of a sample of British companies has lent tentative support to both universalistic and contingency arguments. The findings of this research suggest...the two arguments are compatible'.

#### 2.2.4.11. Webb Model (1974)

When evaluating organisational effectiveness, Webb (1974) believes that there is no globally acceptable theory to assess the effectiveness of an organisation, and OE criteria are selected on the basis of researchers' particular interests or specialities. Further, he blames the diversity of approaches (goal, systems...) used for measuring OE for the difficulty in arriving at a consensus definition of the concept of OE. Webb's theory acknowledges that the effectiveness construct should be multidimensional in nature.

This model presents an exploratory study of voluntary organisations in general and of the institutional church in particular. The model confirms that the goal and systems models are logical extension of each other, and Webb chooses only to postulate numerous operative goals that the organisation pursues simultaneously as determinants of organisational effectiveness. In this respect, Webb (1974, p. 669) states:

To conduct this study it was necessary first to develop an index of effectiveness. Since effectiveness was defined as the degree to which the various church organisations attained their goals, a list of 28 church goals or objectives was initially developed.

The findings of Webb's survey (of church members) for measuring overall effectiveness of the church resulted in building a general model of OE consisting of four indicators (or organisational characteristics). These indicators are: cohesion, efficiency, adaptability, and support.

Webb (1974, p. 672) explains that 'this dominant characteristic [cohesion] refers to a positive working relationship among the membership. A team spirit and a commonality of interests and activities would also seem to be indicative of a cohesive unit'.

For the second indicator of OE, Webb (1974, p. 672) states that 'efficiency is the state of producing a desired result while minimising the expenditure of time, effort, and expense. The emphasis is on the prevention of waste'.

Thirdly, Webb (1974, p. 672) defines adaptability as 'a congregation's readiness to accept change and its ability to respond effectively to change and regain its original level of operation'.

For the final determinant of OE, Webb (1974, p. 672) states ‘this characteristic [support] refers to the degree to which the membership stands behind the minister...It also refers to the minister’s interest in and concern for the welfare of his congregation’.

#### **2.2.4.12. Steers Model (1976)**

Steers (1976) produces a multidimensional model of organisational effectiveness, which views organisations as open-systems and goal-seeking entities. Steers (1976, pp. 55-56) defines organisational effectiveness in terms of ‘an organisation’s ability to acquire and efficiently use available resources to achieve their goals’. This definition suggests that effectiveness is best judged against an organisation’s ability to compete in a turbulent environment and successfully acquire and use its resources. This requires the managers to deal effectively with their external environments to secure needed resources (Steers 1976).

In constructing an effective model of organisational effectiveness, Steers (1976) believes that one should have a dynamic approach to the topic of effectiveness so as to understand the processes involved in bringing about an effective level of operations. Steers (1976, p. 57) calls this dynamic approach a “process model” of effectiveness, and claims ‘its aim is to provide managers with a framework for analysis of the major *processes* involved in effectiveness’. The process model consists of three OE determinants: goal optimisation, systems perspective, and human behaviour (Steers 1976).

This model of organisational effectiveness differs from earlier models because instead of specifying the criteria for effectiveness, it focuses on the processes of becoming effective. In this respect, Steers (1976, p. 57) clarifies that:

These three components, taken together, provide a useful vehicle for the analysis of effectiveness-related processes in organisations. This multidimensional approach has several advantages over earlier models—in particular, the advantage of increasing the comprehensiveness of analysis aimed at a better understanding of a highly complex topic.

Steers appropriately justifies the selection of the different components of the process model. In selection of goal optimisation, Steers (1976, p. 61) claims that ‘optimised goals (that is, what an organisation is capable of attaining) can provide realistic parameters for the assessment process’. The utilisation of the system perspective in this model is justified when Steers (1976, p. 62) asserts that ‘the use of a systems perspective allows for the explicit recognition of the ways in which various organisational factors blend together to facilitate or inhibit effectiveness-related activities’. Finally, in choosing the element of human behaviour, Steers (1976, p. 62) states:

It is highly desirable to recognise the important link between human behaviour and organisationwide performance. That is, any consideration of how organisations become effective (or more effective) must account for the primary determinant of ultimate organisational performance: the employees of the organisation.

#### **2.2.4.13. Evan Model (1976)**

This model draws on systems theory to measure organisational effectiveness. It is a “value free” model presented by Evan (1976) in what could be termed a systems efficiency model of organisational effectiveness (Zammuto 1982). In this model, the organisation is characterised ‘as a goal-setting, goal-seeking, and goal-changing type of social system, an organisation is in the process of changing its initial conditions from one time period to the next’ (Evan, 1976, p. 20).

Evan (1976, p. 19) assumes that ‘from a systems theory perspective, an organisation is a social system which, in its interaction with its environment, activates at least four systemic processes’. These four common major cyclical processes (in productive cycle organisations) are: 1. inputs of the various types of resources; 2. transformation of resources with the aid of social and/or technical mechanisms; 3. outputs which are transmitted to other systems; and 4. feedback effects from the environment. Therefore, Evan (1976, p. 21) attempts to suggest a new conceptualisation and operationalisation of organisation effectiveness by these four systemic processes:

As a multidimensional concept, organisational effectiveness may be defined as the capacity of an organisation to cope with all four systemic processes relative to its goal-seeking behaviour—however explicit or implicit this may be.

Then, Evan (1976) presented nine ratios, as indicators of organisational effectiveness, symbolising different relationships between inputs, transformations, and outputs. The model claims to be applicable to any type of organisation, because these ratios (or measures) of OE reflect the state of the organisation longitudinally and cross-sectionally, and thus provide information necessary for decision makers to adjust organisational processes in order to minimise the values associated with “universal” input, transformation, and output goals (Zammuto 1982). The choice of indicator (out of nine) or set of indicators to measure a particular OE ratio depends entirely on the type of organisation and the purposes and resources of investigator (Evan 1976).

This model illustrates and clearly demonstrates that the systems model approach shifted the factual focus of OE evaluation from organisational ends (goals) to organisational processes, and it is assumed that, since the cyclic and productive processes (input-transformation-output) are common to all organisations, the model provides a value-free method of assessing organisational effectiveness (Zammuto 1982).

Finally Connolly et al. (1980) comment that ‘more operationally, Evan (1976) draws on systems theory to suggest categories of measurable variables that might be related to effectiveness, but leaves the criterion problem essentially unresolved’.

#### **2.2.4.14. Stewart Model (1976)**

This model is based on an open-system perspective and designed to test several hypotheses concerning goal effectiveness factors (Stewart 1976). In the process of building the OE model, Stewart (1976, p. 111) intimates:

What is needed is a model that will first, specify the multiple dimensions and their specific measures of effectiveness, and second, be useful as a conceptual framework for comparative purposes. A framework of organisational effectiveness can be derived from systems requirements, which are related to the organisation’s internal and external environment.

Stewart (1976, p. 112) selects acquisition (external adaptation), consolidation, power, and goal achievement as indicators of OE for this model and infers that ‘thus,



effectiveness is defined as the extent to which a social system makes progress toward its acquisition, consolidation, power and goal objectives’.

In justifying the selection of these criteria for the model, Stewart (1976) identifies four phases of organisation development as foundation, consolidation, operations, and achievement of goals, and believes that, in addition to these phases, an organisation must also successfully meet the four organisation functional requirements (goal attainment, adaptation, integration, and latency) to maintain itself and survive. Further Stewart (1976, pp. 111-112) explains that ‘the problem of external adaptation, integration, and latency are related in a special way to the foundation and consolidation phases, while other adaptive functions and goal attainment are related to the operations and achievement phases’. The relationship between these functions and OE criteria are shown in Table 4.4.

To test this model, Stewart (1976, p. 120) carried out a survey on an organisation of Catholic priests and concluded that ‘although the model presented...specifies four necessary dimensions of organisational effectiveness, this author feels that goal effectiveness is the most important [dimension]’.

Table 4.4: A system effectiveness model

Career Stage		Functional Requirement	Objectives	Effectiveness
Performance	Foundation	*Adaptation (external)	Acquisition	Acquisition
		*Adaptation (internal)	Power	Power
	Consolidation	*Integration	Consolidation	Consolidation
		*Latency (cohesion)	--	--
		Adaptation (internal)	--	--
	Operation	*Adaptation (external)	Acquisition	Acquisition
		*Adaptation (internal)	Power	Power
		Integration	--	--
		Latency (cohesion)	--	--
		Goal attainment	--	--
	Attainment	*Goal attainment	Goal	Goal
		Adaptation	--	--
		Integration	--	--
		Latency (cohesion)	--	--
*Dominant (theoretically speaking)				

Source: Adapted from Stewart (1976, p. 112)

#### **2.2.4.15. Kilmann and Herden Model (1976)**

Kilmann and Herden (1976) attempt to evaluate the impact of intervention on organisational effectiveness. As the ultimate goal of any organisation should be to increase effectiveness, this model is designed to facilitate the evaluation of intervention (Kilmann & Herden 1976).

This model of organisational effectiveness is derived from Jung's (1923) theory of psychological types; that is, problem solving styles. According to Jung (1923), there are two ways by which an individual can perceive: by sensation (S) or by intuition (N), and two ways of judging: thinking (T) and feeling (F).

Four problem-solving styles are developed by combining Jung's two ways of judging with the two ways of perceiving, namely: 1. sensation-thinking (ST), 2. intuition-thinking (NT), 3. sensation-feeling (SF), and 4. intuition-feeling (NF).

In constructing a model of OE using the above mentioned psychological functions, Kilmann and Herden (1976, p. 91) highlight:

The Jungian framework provides a useful description of organisational effectiveness, i.e., the ST, NT, NF, and SF psychological functions. Conceptualisation of organisational (evaluation) problems and components of organisational effectiveness is influenced by the same basic psychological functions.

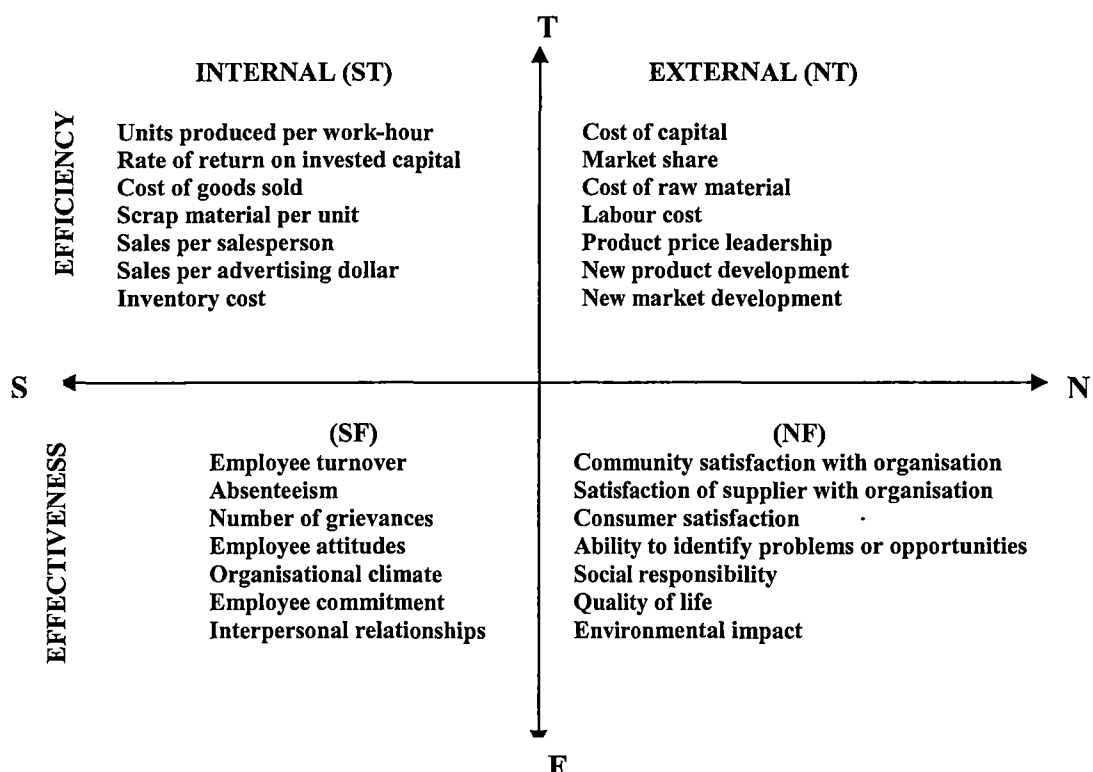
The general framework of this model of organisational effectiveness (and its indicators) is presented in Figure 4.3. The goal of the ST component (Internal Efficiency) is to maximise the ratio of outputs to inputs. The goal of the NT component (External Efficiency) is to maximise the bargaining position of the organisation in environment exchanges. The objective of the SF (Internal Effectiveness) is to maximise member motivation. The aim of the NF (External Effectiveness) is to maximise societal satisfaction (Kilmann & Herden 1976).

Kilmann & Herden (1976) strongly believe that the major dimensions of efficiency and effectiveness in their model are similar to the components of organisational effectiveness identified by Katz and Kahn (1966).

Finally, Kilmann & Herden (1976) infer that the four components of effectiveness are interrelated, and suggest that organisational effectiveness is a multiplicative function of the four components:

Organisational Effectiveness = (Internal efficiency × External Efficiency × Internal Effectiveness × External Effectiveness)

**Figure 4.3: Measures of Organisational Effectiveness**



Source: Kilmann and Herden (1976, p. 95)

#### 2.2.4.16. Scott Model (1977)

Scott (1977) reviews the literature on organisational effectiveness and identifies disagreements about the followings:

- what properties or dimensions are encompassed by the concept of effectiveness;
- who does or should set the criteria to be employed in assessing effectiveness;
- what indicators are to be used in measuring effectiveness; and
- what features of organisations should be examined in accounting for observed differences in effectiveness.

Initially, Scott (1977) examines the concept of goals and its relationship to OE criteria. He makes a clear and important distinction between goals that are sources of control or motivation (directing and motivating participants) and those used to evaluate organisational effectiveness. Scott (1977, p. 66) does not reject the notion of goals totally and cautions that 'if the concept is to be used at all, goals are better understood not as prescriptions for the future but as explanations of the past'.

In considering the difficulty of explaining effectiveness, Scott (1977, p. 89) argues:

We should not seek explanations for organisational effectiveness in general since it is not clear to what, if anything, this concept refers. Rather, we should attempt to develop and test more precise predictions relating particular measures of effectiveness to particular features of organisations or systems of organisations.

Scott (1977, p. 68) reviews the nature of organisational effectiveness criteria and states 'the setting of standards is a central component in establishing criteria for evaluating the effectiveness of an organisation. Clearly, these standards are normative and not descriptive statements'. He suggests that instead of searching for some specific universal criteria of effectiveness, we should concentrate on a more limited set of criteria.

Finally, Scott (1977) considers three indicators for his OE model: outcomes, processes, and structures, and argues that these are clearly applicable to a wide variety of organisational settings. The selection of outcomes is justified as focusing on specific characteristics of materials or objects upon which the organisation has performed some operation (e.g. quality) and they are often regarded as quintessential indicators of effectiveness. Further, Scott (1977, p. 82) justifies the selection of processes because:

Measures of organisational processes are widely utilised in assessing organisational effectiveness. The standards employed focus attention on the

activities performed by organisational participants, and assessment consists of determining the degree of conformity to these performance standards.

Structure in this model refers to organisational features or participant characteristics presumed to have an impact on organisational effectiveness (e.g. measures of the adequacy of facilities and equipment, qualification of staff, and age distribution of management).

#### **2.2.4.17. Pennings and Goodman Model (1977)**

This model attempts to synthesise and extend the conceptualisation of organisational effectiveness. Pennings and Goodman (1977, p. 148) view organisations as:

Open systems having exchange relationships with their environment and with subsystems that render a contribution to the whole and to each other, show some degree of interdependence, and display some structural arrangement that tunes them in to each other and to the environment.

In addition, they see organisations as comprising internal interest groups, or constituencies (i.e. any group within an organisation whose members have identifiable common interests), which make claims on the organisation. Out of these definitions, Pennings and Goodman (1977) attempt to identify the determinants of organisational effectiveness. Thus, they draw organisational subsystems (internal determinants) and environment (external determinants) as both determinants of organisational effectiveness and constituency of effectiveness.

Internal determinants (subunits) are defined as the factors within the organisation itself that enhance or inhibit effectiveness (Pennings & Goodman 1977). The presence of subunits cannot be denied in an open system perspective, and the organisation benefits from the conglomerate of subunits; it enhances the scope of the concept of effectiveness by not focusing exclusively on output parameters, and it avoids the conceptual difficulties of the systems resource acquisition approach (Pennings & Goodman 1977). That is, OE is associated with the contribution of subunits. Pennings and Goodman (1977) employ the theory of organisational power to demonstrate the effects and differential contribution of subunits to effectiveness. The power theory assumes that organisational effectiveness depends on a subunit's ways of coping with uncertainty, its

substitutability, and its centrality (three concepts of the strategic contingencies theory of organisational power).

Another factor considered in this model is the role and effect of constituencies on determining the criteria of effectiveness. Pennings and Goodman (1977) advocate using representatives from various constituencies as a “dominant coalition” (the ultimate source for establishing the criteria of organisational effectiveness), and argue that within a given organisation, the dominant coalition would specify the meaning of organisational effectiveness. This is, in fact, the first formal model employing a multiple constituency perspective (Zammuto 1982).

Pennings and Goodman (1977, p. 154) describe the role of environment in this model as ‘actors in the environment are determinants of effectiveness when they have some control [power] over the focal organisation’s input acquisition or its output disposal’. As it can be noted, power theory perspective is utilised to explain this determinant, but the element of actors’ ability to cope with uncertainty is less important than substitutability and centrality. So the authors have introduced institutionalisation in lieu of coping with uncertainty. In this respect, Pennings and Goodman (1977, p. 157) comment that ‘these three aspects—substitutability, centrality, and institutionalisation—indicate the likely influence of suppliers, buyers, or third parties [actors in the environment] on the focal organisation’s activities and hence its effectiveness’.

Since power is explicitly used as an underlying theme in this model (dominant coalition model) of organisational effectiveness, some researchers have named it a power model and some a dominant coalition model (for example, Zammuto 1982, 1984; Keeley 1984; Kraft et al. 1996; Cameron 1981b).

This open system-based model can be summarised as having two major determinants; namely subunits and environment. Each determinant utilises the principle of power theory to explain its impact on organisational effectiveness. That is, coping with uncertainty, substitutability, and centrality can be used to explain subunits’ contribution to effectiveness, and similarly substitutability, centrality, and institutionalisation can be used to indicate the influence of actors in the environment on effectiveness.

#### 2.2.4.18. Cunningham Model (1978)

This open system-based model is designed to illustrate how open systems theory can be applied in the evaluation of organisational effectiveness (Cunningham 1978). The conceptualisations of organisational effectiveness exercised in this model are similar to those of Katz and Kahn (1966) and Yachtman and Seashore (1967) in developing a systems resource model.

After defining a basic systems model (particularly open systems), Cunningham (1978, p. 635) endeavours to define organisational effectiveness and explains that 'criteria of organisational effectiveness are derived from some conceptualisations of the requirements which organisations have to meet in order to survive and to work effectively within a given situation'. In other word, he attempts to measure the effectiveness of the organisation in terms of its ability to meet the requirements arising from its situations. According to Cunningham (1978), these abilities, which are selected as indicators of OE, are:

1. The organisation's ability to search out and respond to the properties of the external environment (control over environment);
2. The organisation's ability to use its resources in producing outputs and in maintaining and restoring the system (efficiency); and
3. The organisation's ability to bargain and optimise its use of resources in an environment with a number of decision-makers, each with different objectives (system resource).

In justifying the first OE criteria, Cunningham (1978, p. 636) explains that 'the capability to respond to the external environment represents an estimation of the problems which could occur in each organisational subsystem and its comparison with the resources which the subsystem has available to respond'.

The selection of efficiency (second criteria) is rationalised by Cunningham (1978, p. 636) by saying that 'the efficiency of an organisation tells us how well the organisation utilises the energy at its disposal in producing outputs, and in maintaining and restoring the organisation'. Cunningham (1978, p. 637) divides the concept of efficiency into two components: potential efficiency and actual efficiency and urges that 'the actual

efficiency is a measure of its [organisation's] outputs; the potential efficiency is a measure of its [organisation's] capability; the smaller the difference between them, the more efficient that organisation actually is'.

Finally, Cunningham (1978, p. 638) substantiates the third criterion of this model as:

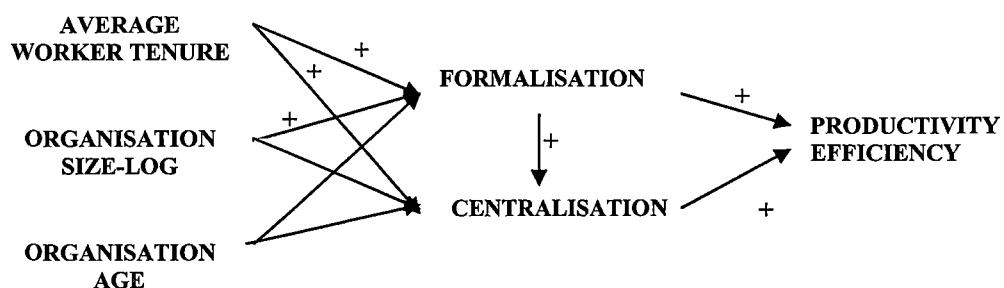
An organisation that fully actualises its bargaining potential should not so deplete the environment as to be unable to produce further resources. Furthermore, an organisation that ruthlessly exploits its environment is more likely to incite a strong, organised opposition that may weaken or even destroy the organisation's bargaining position...[therefore] the highest level of organisation is reached when the organisation maximises its bargaining position and optimises its resource procurement.

#### 2.2.4.19. Glisson and Martin Model (1980)

This model examines the effectiveness of human service organisations by measuring the relationship between effectiveness and a variety of organisational characteristics—in this case, centralisation and formalisation. The two OE variables chosen for this model are productivity and efficiency. In this model, Glisson and Martin (1980, p. 22) define the productivity criterion as 'the quantity of service provided' and the efficiency criterion as 'the unit cost of providing service'.

As shown in Figure 4.4, Glisson and Martin (1980) hypothesise that worker tenure, organisation size, and organisational age are related (positively and negatively) to formalisation and centralisation, and in turn, formalisation and centralisation are positively related to the effectiveness criteria (productivity and efficiency).

**Figure 4.4: Hypothesised model of the influence of organisational size, age, and structure on productivity and efficiency**



Adapted from Glisson and Martin (1980, p. 22)



In this model, centralisation refers to the degree to which the authority and decision making power in the organisation is concentrated versus dispersed, and formalisation refers to the degree to which divisions of labour and procedures are explicit rather than implicit (Glisson & Martin 1980).

Glisson and Martin (1980) conducted a survey to test their hypothesis. Thirty organisations dispensing different human services participated in the survey to measure productivity by the number of clients served per week per worker, and efficiency by the number of clients served per week per \$10,000 of annual budget.

The findings of the survey indicate that 1) centralisation is positively associated with productivity and efficiency (as hypothesised); 2) formalisation has a marginal negative relationship with productivity and efficiency; 3) centralisation is positively associated with formalisation.

Whilst this model is accepted in the literature (Forbes 1998) and the determinants are prevalent in a number of models, Goodman, Atkin and Schoorman (1983, p. 175) cannot ignore the shortcomings of the model and question, not only this model, but all determinant approach models:

...[the determinant approach model] fails to increase our understanding of OE because (a) the relationship between indicators and OE is not examined; (b) generally single indicators are examined without reflecting their relationship with other OE indicators in which they may be in conflict; (c) the models specifying the determinants are typically underspecified and the time frame for estimating the criterion variable is rarely explored; and, (d) there is a tendency to interpret indicator information as the same although the organisational units are very different.

#### **2.2.4.20. Connolly, Conlon and Deutsch Model (1980)**

This is multiple-constituency model of organisational effectiveness and suggests that organisations are effective to the extent to which their constituencies are at least minimally satisfied (Lachman & Wolfe 1997). Unlike other models of OE (goal or systems models) that usually attempt to answer “how well is entity X performing?” and

“how much better should entity X perform?”, multiple-constituency models try to answer the question “how is entity X performing?” (Connolly et al. 1980).

Since most organisations have multiple constituents and multiple effectiveness domains, a multiple set of effectiveness criteria should be used (Hitt 1988). Connolly et al. (1980, p. 213) contend that they do not treat effectiveness as a single statement ‘but as a set of several (or perhaps many) statements, each reflecting the evaluative criteria applied by the various constituencies involved to a greater or lesser degree with the focal organisation’. They also believe that judgements of effectiveness are inevitably contingent upon which individuals or groups (constituencies) supply the criteria for evaluation. In this respect, they (1980, p. 212) state:

...individuals become involved with an organisation (as owners, managers, employees, customers, suppliers, regulators, etc.) for a variety of different reasons, and these reasons will be reflected in a variety of different evaluations. It appears somewhat arbitrary to label one of these perspectives a priori as the “correct” one.

This statement suggests that different constituents will likely rate an organisation or unit in different ways. Each of these stakeholders (constituents) may have a different idea of what effectiveness means or different expectations of what is to be accomplished by a given organisation. So it would be meaningful to discuss organisational effectiveness only in terms of the perceptions of these various constituents (Kraft & Jauch 1992). In other words, it can also be argued that organisations must identify multiple domains of effectiveness and that a multitude of effectiveness criteria measures are needed for a more comprehensive evaluation of organisations.

Connolly et al. (1980, p. 214) have not conducted any empirical research for their proposed shift in the conceptual framework of organisational effectiveness and suggest:

Without attempting a detailed research agenda, we would like to suggest three areas in which the conceptual shift might lead to a reorientation of empirical study addressing “effectiveness”: the distribution of organisational satisfaction; issues of organisational location and change; and the time dimension as it relates to effectiveness.

The first element of this model (organisational satisfaction) deals with constituencies’ satisfactions. This issue is explained as:

“Constituency” is intended as more inclusive than “direct participant”; and an “effectiveness statement” from any one of them is broader than their satisfaction with their own direct transaction with the focal organisation...broadly, the concern here is with power issues, and with the ability of constituencies to recognise, develop, and exercise power so as to shift the distribution of satisfactions in their favour (Connolly et al. 1980, pp. 214-215).

The second issue of the model (organisational location and change) supports the idea that organisations can actively change their constituencies by changing the products and services they offer, the type of clients or geographic region served, and so on (Zammuto 1984). In this regard, Connolly et al. (1980, p. 215) explain that ‘the organisation’s location is not merely geographic, but implies its existence as including some influence loops rather than (or more extensively than) others. In this sense, location may be a key strategic matter for currently powerful constituencies to manipulate’.

The last issue of this model (time dimension) suggests that differences in constituent time frames provide opportunities for organisations to sequence their attention to the demands of various constituencies (Zammuto 1984). Connolly et al. (1980, p. 215) clarify that:

In a multiple-constituency perspective, the time issue becomes technically more complicated but conceptually clearer. Different constituencies may be dealt with by an organisation in different time frames. This permits a focal organisation to “time share” in terms of attention paid to the various constituencies.

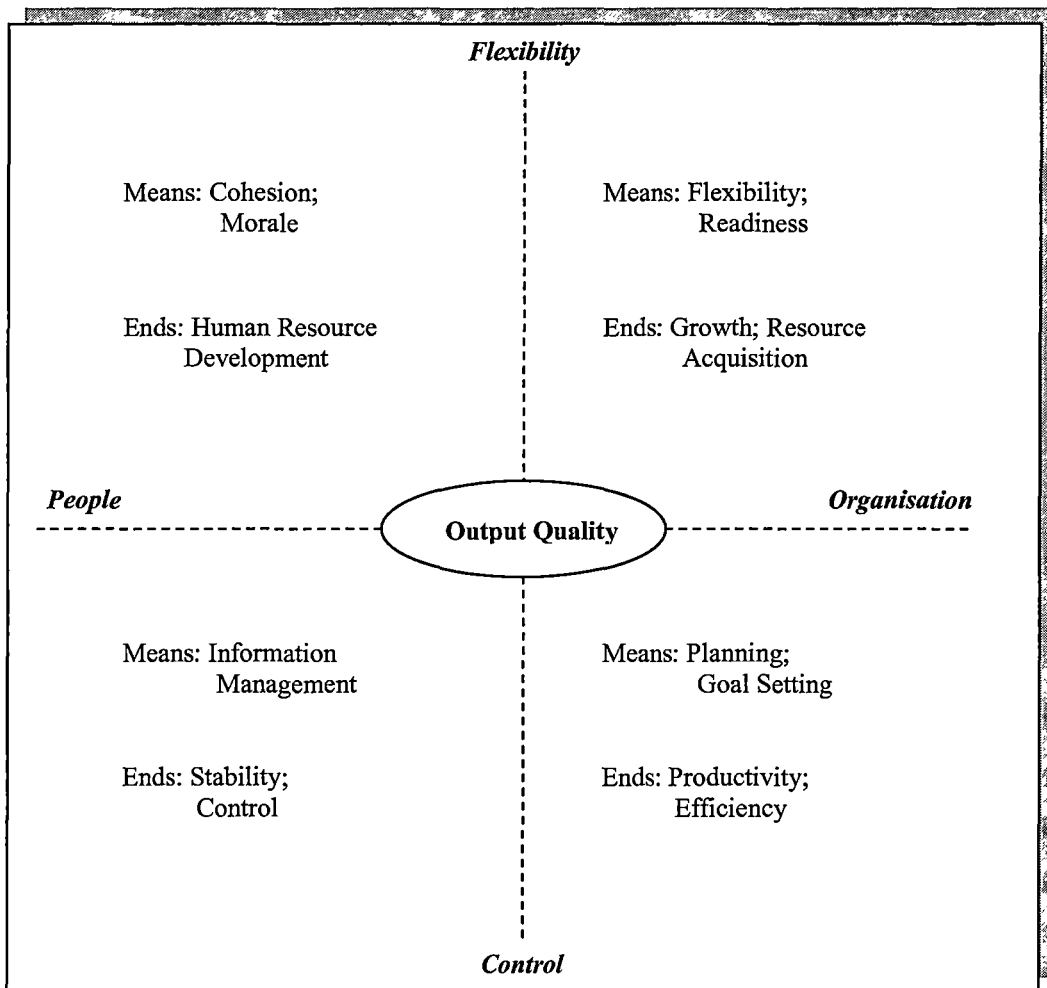
This model is widely supported and accepted in the literature (for example, Zammuto 1982, 1984; Cameron & Whetten 1983a; Nord 1983; Keely 1984; Kraft & Jauch 1988; Hitt 1988; Ostroff 1993; Thibodeaux & Favilla 1996; Kraft et al. 1996; Lachman & Wolfe 1997; Forbes 1998; Zellars & Fiorito 1999; Rojas 2000; Schmid 2002).

#### **2.2.4.21. Rohrbaugh Model (1981)**

This model presents a competing value approach to evaluate organisational effectiveness. Rohrbaugh (1981) believes that a conceptual competing value approach provides considerable clarification to the issue of assessing organisational performance. The framework utilised in this model is based on previous study evaluating public organisations’ performance by Rohrbaugh and Quinn (1980). This framework suggests

that three basic value dimensions are fundamental to the assessment of organisational performance (shown in Figure 4.5). The first set of values is related to organisational structure (vertical axis, flexibility and control). The second set of values is related to organisational focus (horizontal axis, well-being and development of the people in the organisation and the organisation itself). The third set of values related to organisational means and ends (processes—e.g. planning and goal setting, and final outcomes—e.g. productivity) (Rohrbaugh 1981).

**Figure 4.5: Dimensions of organisational effectiveness**



Source: Adapted from Rohrbaugh (1981, p. 143)

As depicted in Figure 4.5, the competing values framework (with the output quality at the centre of all competing values) suggests a number of indicators for measuring organisational effectiveness. Rohrbaugh (1981) used these indicators as the basis for the selection of appropriate performance measures for local employment offices. After conducting a survey, it was revealed that eight indicators scored very high and could be

used as correct measures of organisational effectiveness. These criteria are: resource acquisition, productivity, stability, human resource development, flexibility, planning, information management, and cohesion.

Rohrbaugh (1981, p. 159) concludes that there is no absolute answer to the question of “how well are these Employment Service offices performing?”, but the present model ‘makes clear that, formally or informally, organisational performance can be assessed. There are numerous attributes of office effectiveness, and the competing values approach clarifies the organisational emphases that undergird each one’.

#### **2.2.4.22. Cameron and Whetten Model (1981)**

Cameron and Whetten (1981, p. 525) criticise previous approaches to organisational effectiveness as:

They [(researchers)] operationalised the construct based on the availability of data, and then justified the decision by referencing isolated empirical studies that used similar measures. The resulting research literature is a plethora of unintegrated and noncumulative findings.

Cameron and Whetten (1981) mainly focus on two deficiencies in the literature on organisational effectiveness: 1) the over-reliance on researcher-imposed criteria of effectiveness, and 2) the tendency to measure perceptions of effectiveness at only one point of time. In addition, they argue that the debate about the proper measurement of effectiveness has deflected attention from the need to examine the meaning of effectiveness to organisational members. Due to these problems and an attempt to rectify them, they suggest two interrelated solutions; firstly, the need to rely less on investigator-imposed definitions of effectiveness and more on the meaning that different groups of organisational members place on this concept; and secondly, organisational life cycles should be involved in assessment of organisational effectiveness because the judgments and perceptions of organisational members change at different stages in the organisation’s development.

Surveys were conducted over eighteen simulated<sup>12</sup> small organisations by Cameron and Whetten (1981) to determine important measures of effectiveness in each organisational life cycle stage. The results of surveys indicated that, firstly the major characteristics of simulated organisations change predictably over time and develop through stages similar to those of real organisations; secondly, the preferences of members of these organisations changed over organisational life cycle states; thirdly, the main emphases (at different stages) were on resource acquisition, efficiency of production, and internal processes. In this regard Cameron and Whetten (1981, pp. 537-538) state:

In the first stage of entrepreneurship and creativity, emphasis was on resource acquisition (input domain)...In the later formalisation and control stage, the emphasis was on efficient production (output domain)...Ratings of the importance of effectiveness in the domain of internal processes remained constantly high throughout all stages of development.

Finally, on the importance of evaluation of organisational effectiveness over organisational life cycles, Cameron and Whetten (1981, p. 540) conclude:

The interpretations of organisational effectiveness made by organisational members change in systematic ways across organisational life cycle stages. As organisations progress through early life-cycle stages, different elements become more or less emphasised, and the information available to participants changes in its nature and scope.

#### **2.2.4.23. Gaertner and Ramnarayan Model (1983)**

Undoubtedly, organisational effectiveness measurement is a massive undertaking as suggested by Gaertner and Ramnarayan (1983), but the need for it is clear and definite. Gaertner and Ramnarayan (1983, p. 97) define organisational effectiveness as ‘the ability of an organisation to account successfully for its outputs and operations to its various internal and external constituencies’. By this definition, Gaertner and Ramnarayan (1983) carry the open-systems perspective a step further by taking the interests of a board set of constituencies into account. After reviewing and scrutinising previous approaches to organisational effectiveness, Gaertner and Ramnarayan (1983) argue that each of the major approaches utilises different effectiveness measures,

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<sup>12</sup> Cameron and Whetten (1981, p. 529) define organisational simulations as ‘representations of the behaviours, processes, and outcomes occurring in real organisations. They are essentially “automated theories” or sets of assumptions about organisational behaviour that are acted out’.

representing selective interpretation of events with different aims and audiences. So, they suggest that different effectiveness measures are required for internal versus external constituents (audiences).

Gaertner and Ramnarayan (1983) predominantly rely on two elements of the organisation's productive cycle—processes and outputs, as measures of their OE model and produced four distinct perspectives on organisational effectiveness, each focusing on measures of a particular kind of activity intended for a particular audience (internal or external). In describing the model, Gaertner and Ramnarayan (1983, p. 104) stress that 'clearly, any comprehensive attempt to assess organisational effectiveness will consider both output and process, in both internal and external accounts'. Finally, Gaertner and Ramnarayan (1983, p. 105) summarise the discussion:

The assessment of organisational effectiveness rests not simply on how much of particular outputs is being produced but also on the decision making that sets the framework in which the production of these outputs is carried out...Effectiveness also rests on the extent to which these accounts mesh with the environment, with the processes they are supposed to represent and with each other.

In conclusion, Gaertner and Ramnarayan (1983) claim that this model has the following advantages over existing models:

- it allows an examination of both outputs and processes in a critical and holistic way, and it recognises the roles of each and the linkage between them as critical to effectiveness;
- effectiveness in the model is seen less as an end state than as a contentious process relating organisation to its constituents;
- with the focus on processes common to many organisations rather than outputs unique to each of them, the results obtained can be both plausible and useful; and
- it can produce rich and useful assessments of organisational outputs and processes that do justice to the variety and complexity of organisational life.

#### **2.2.4.24. Quinn and Rohrbaugh Model (1983)**

Quinn and Rohrbaugh (1983) presented a relatively new approach to the study of organisational effectiveness. Unlike previous approaches to OE, they focus on the

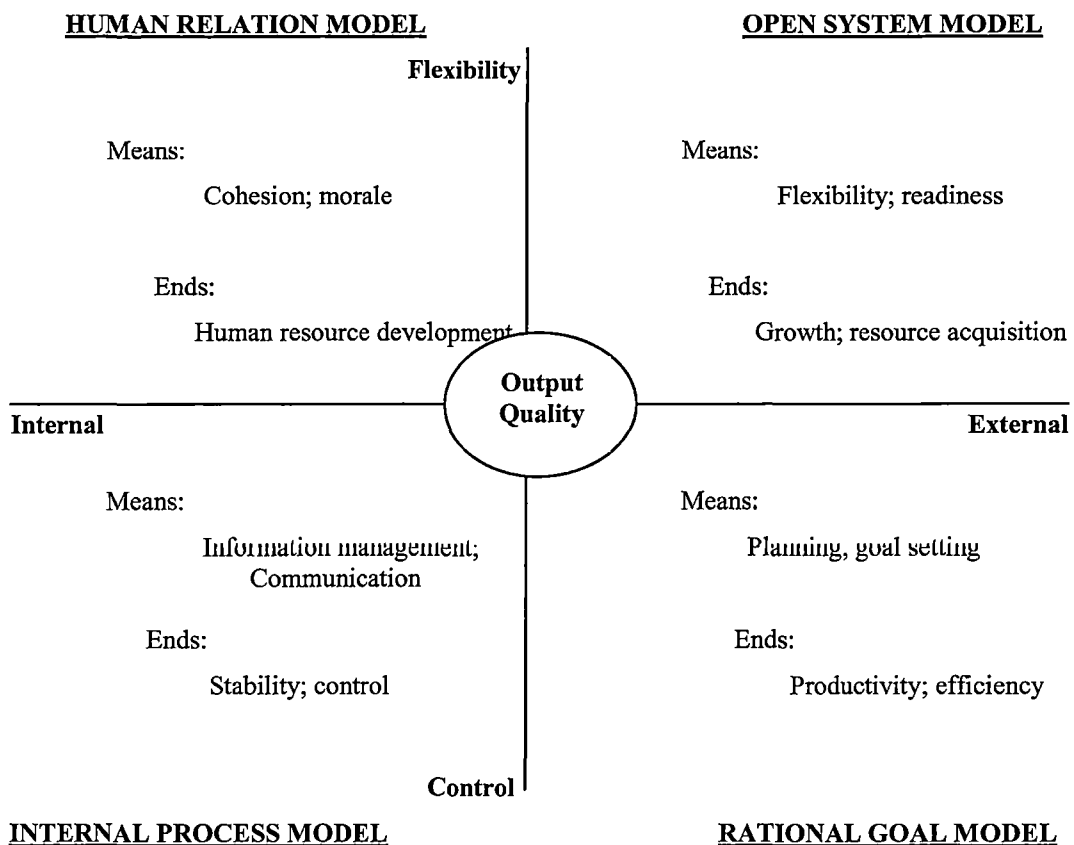
cognitive structure of the organisational theorist, and not on the operational structure of the organisation. They pose a question of “how do individual theorists and researchers actually think about the construct of effectiveness?” and utilise a multidimensional scaling to approach the problem.

Quinn and Rohrbaugh (1983) selected Campbell's (1977) list of 30 indices of organisational effectiveness (Table 4.1) as the basis of their research and asked seven individuals (professionals) who had research interest in the area of organisational effectiveness to participate in a two-stage judgment task survey to identify the proper construct of effectiveness by reducing and organising the list of 30 criteria.

In the first stage, participants were asked to eliminate overlaps, and in the second stage to evaluate the similarity of all possible pairing of the remaining items. The result was a reduced list of 17 effectiveness criteria bearing 136 paired comparisons (after subjecting to multidimensional scaling to identify basic underlying dimensions of organisational effectiveness). Quinn and Rohrbaugh (1983) then decided to replicate the pairing and scaling processes of the reduced list with a larger, more diverse group of active organisational theorists and researchers. The same results appeared as before with only slight alterations. Quinn and Rohrbaugh (1983, p. 369) state ‘the findings suggest that organisational researchers share an implicit theoretical framework and, consequently, that the criteria of organisational effectiveness can be sorted according to three axes or value dimensions’. These three value dimensions represent: 1) an internal focus versus an external focus (horizontal axis); 2) a concern for flexibility versus a concern for control (vertical axis); and 3) a concern for means versus a concern for ends (as it can be noted, these findings are very similar to those of Rohrbaugh (1981)).

After carefully examining the results of the multidimensional scaling, Quinn and Rohrbaugh (1983, pp. 370-371) infer that ‘it becomes clear that the separation of the 17 effectiveness criteria in the three-dimensional space graphically defines four models and brings considerable precision to the development of a construct of effectiveness’. A presentation of these middle range models of organisational effectiveness and their relationships (termed as “spatial model”) is shown in Figure 4.6.



**Figure 4.6: Models of organisational effectiveness**

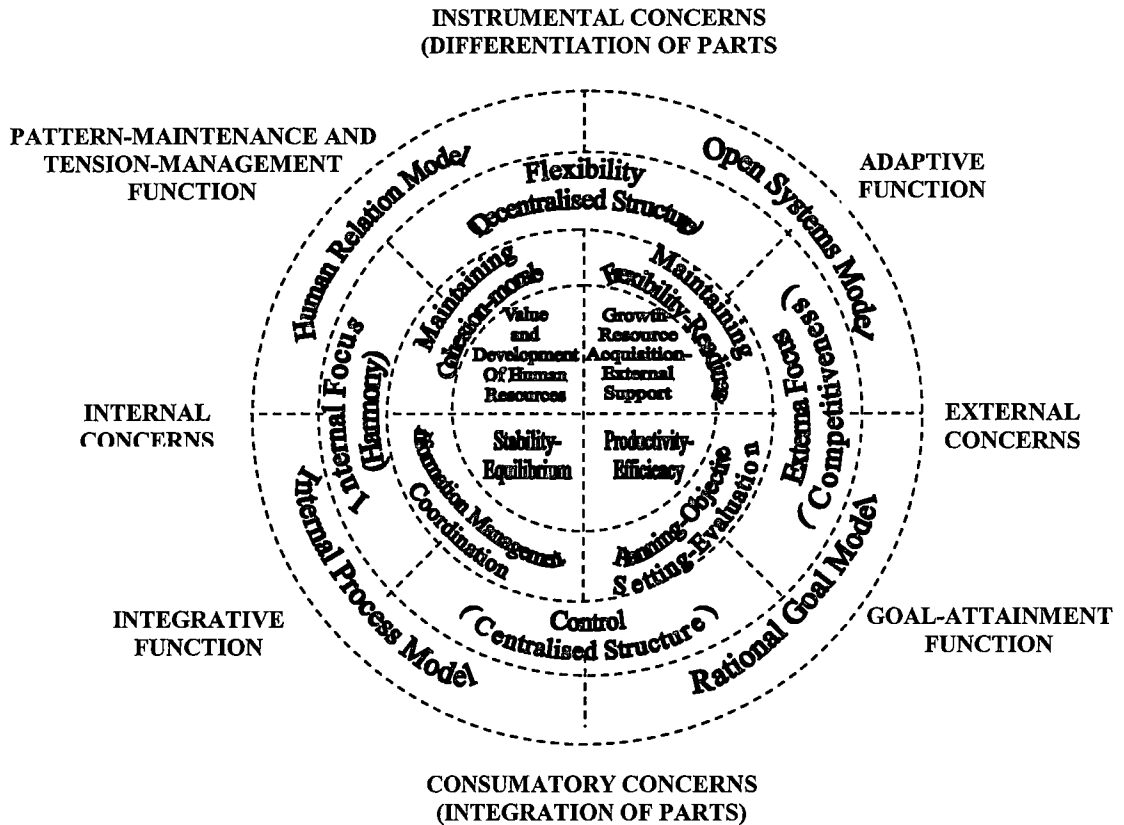
Source: Adapted from Quinn and Rohrbaugh (1983, p. 369)

As depicted above, the human relation model emphasises flexibility and internal focus, and stresses cohesion and morale criteria as the means with human resource development as the ends. The open system model emphasises flexibility and external focus and stresses flexibility and readiness as the means with growth, resource acquisition, and external support as the ends. The rational goal model emphasises control and external focus, and stresses planning and goal setting as the means with productivity and efficiency criteria as the ends. The internal process model emphasises control and internal focus, and stresses information management and communication as the means with stability and control as the ends. The output quality criterion is the last to be grouped with any of the other effectiveness criteria (Quinn & Rohrbaugh 1983).

Quinn and Rohrbaugh (1983, p. 372) claim that ‘while these four approaches are relatively well known, their interrelationship[s] in terms of the three value dimensions (as well as the performance criteria they subsume) have never been clearly specified’.

Thus, they claim that the spatial model can make clear the relationship between these four models. These relationships are mapped in Figure 4.7.

**Figure 4.7: Spatial Model of Organisational Effectiveness**



Source: Adapted from Quinn and Rohrbaugh (1983, p. 372)

The organisational outcomes or ends are shown in the centre of the Figure 4.7, and the criteria reflecting processes or means are placed in the second ring. The third ring contains the first two value continua, flexibility-control and internal-external focus. The four models of organisational effectiveness are placed in the fourth ring. Outside the last ring are the major organisational functions identified by Parsons (1959). Therefore, the vertical axis represents a continuum from instrumental (differentiation of parts/decentralisation) to consumatory (integration of parts/centralisation) concerns, and the horizontal axis represents a continuum from internal to external concerns. For example, the open systems model is embedded in the flexibility and external values; the means are flexibility-readiness and the ends are growth-resource acquisition-external support. The model also parallels the adaptive function of organisation.

According to Quinn and Rohrbaugh (1983), because each model is embedded in a particular set of competing values, there exist differentiations and similarities. For example, the human relation model stands in contrast to the rational goal model, or the human relations and open systems models share an emphasis on flexibility.

This model has been used in a wide variety of organisational research studies, including organisational culture and strategy, effectiveness of information systems, organisational communications, organisational transformation, organisational development, human resource development, and so on (Rojas 2000). According to Rojas (2000, pp. 100-101), the analysis of all existing models suggests that the spatial model 'is the most viable model for measuring OE between for-profit and nonprofit organisations...[it] offers a psychometrically sound approach for measuring OE'.

Despite the criticism from Kraft et al. (1996, p. 104) who state that the model fails 'to identify how the construct should be operationalised', the model has lent itself easily to different situations, and has been used as a basis for further investigations of construct of organisational effectiveness by many researchers.

#### **2.2.4.25. Quinn and Cameron Model (1983)**

This model is another effort to study organisational effectiveness over organisational life cycles. Quinn and Cameron (1983) firstly propose that the criteria of organisational effectiveness change over time and different models of effectiveness have been found to be appropriate at certain times in organisations, but not at other times, so it is a necessity to discover some predictable changes in criteria of OE which could be applied at predictable times in an organisation's development. Secondly, they focus on early life cycle stages of new organisations because changes in life cycle stages seem to occur more rapidly in new organisations than in older, established organisations.

Quinn and Cameron (1983) utilised the spatial model (competing values approach) of Quinn and Rohrbaugh (1983) as a basis for conceptualisation of OE over organisational life cycles. In this regard, Quinn and Cameron (1983, p. 42) give the reason for using the spatial model as:

The reason we use the Quinn and Rohrbaugh model here, in fact, is that it provides a good summary of the major models of effectiveness, and it illustrates well how the appropriateness of the various models of effectiveness changes in different life cycle stages...As organisations progress through their life cycles, the different criteria of effectiveness emphasised by these models should parallel the changing activities and characteristics of organisations over time.

Although many researchers have agreed that the criteria of organisational effectiveness change over time, only a few have investigated how the criteria change (e.g. Rohrbaugh 1981) or if there are predictable patterns of such change. Quinn and Cameron (1983) endeavour to overcome this shortcoming of the literature and strongly believe that assessing effectiveness using outdated or inappropriate criteria will result in inaccurate information about the true level of organisational effectiveness. In this regard, Quinn and Cameron (1983, p. 40) assert:

What is important to point out, however, is that a consistent pattern of development seems to occur in organisations over time, and organisational activities and structures in one stage are not the same as the activities and structures present in another stage. This implies that the criteria used to evaluate an organisation's success in one stage of development also may be different from criteria used to evaluate success in another stage of development.

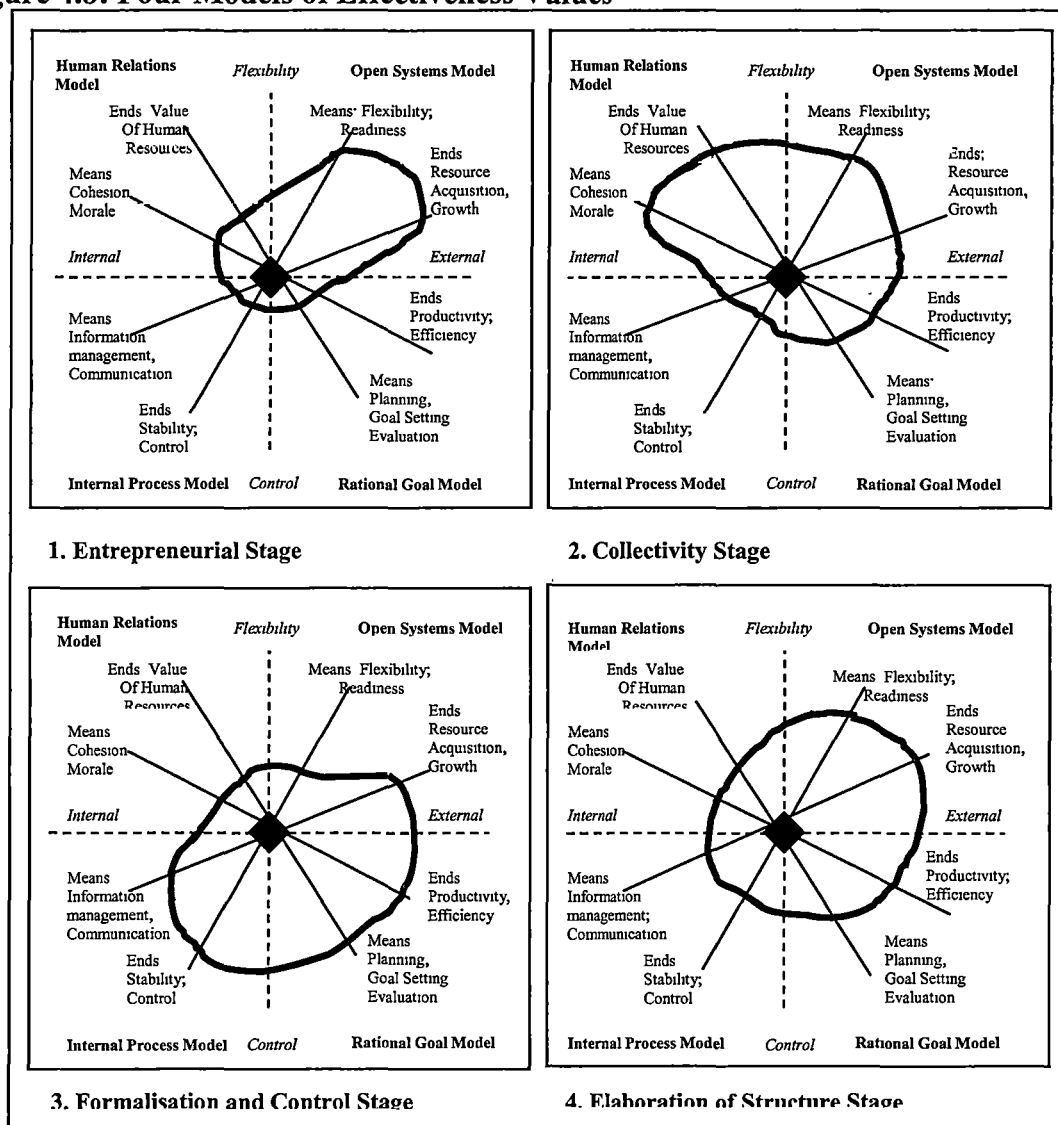
Quinn and Cameron (1983) survey the literature on models of organisational life cycles and confirm that all models contain four life cycle stages. These stages are: 1) entrepreneurial stage; 2) collectivity stage; 3) formalisation and control stage; and 4) elaboration of structure stage.

Based on the competing values approach and organisational life cycle stages, Quinn and Cameron (1983) propose four hypotheses for their model of organisational effectiveness. These hypothesised patterns of effectiveness during the four life cycle stages are illustrated in Figure 4.8.

As shown in this figure, it is hypothesised that, in the entrepreneurial stage, the strongest emphasis appears to be on open systems criteria of effectiveness (flexibility, growth, resource acquisition, and development of external support). In the collectivity stage, organisations are characterised by the criteria associated with the human relations model (human resource development, morale, cohesion, and human need satisfaction),

and to a lesser extent with open systems criteria. In the formalisation and control stage, organisations are typified by criteria in an internal process model (information management, communication, stability, and control) and rational goal model (goal setting, goal attainment, productivity, and efficiency). In the elaboration of structure stage, the strongest emphasis appears to be on an open systems model, while there appears to be a moderate emphasis on other three models.

**Figure 4.8: Four Models of Effectiveness Values**



Source: Adapted from Quinn and Cameron (1983, p. 43)

To test the hypotheses, Quinn and Cameron (1983) selected an organisation to observe relationships between its stages of life cycles development and changes in emphasis given to criteria of organisational effectiveness over time. The observations were made over a three-year period (1974-1976).

According to Quinn and Cameron (1983, p. 49), the results of these observations suggest that 'the changes in the dominant criteria of organisational effectiveness followed the predicted pattern'. Finally on the importance of the life cycles-effectiveness model, Quinn and Cameron (1983, p. 49) conclude that the model 'predicts what criteria of success are likely to take precedence in what sequence, and it allows managers to anticipate the necessary changes'.

#### **2.2.4.26. Smith and Gannon Model (1987)**

This model discusses similar issues as Cameron and Whetten (1981) and Quinn and Cameron (1983) for identification of organisational effectiveness criteria at different stages of organisational growth and development. However, there exists a dissimilarity between this model and the above-mentioned models in the sense that those models have initially proposed OE criteria and then tested the hypothesised model, but this model derives OE criteria from an exploratory study.

Smith and Gannon (1987) based their model on a three-stage model of organisational growth: the start-up (or initial entrepreneurial stage); high growth; and maturity. In this regard, Smith and Gannon (1987, p. 15) claim that 'all of the well-known stage models were reviewed for this study and a three-stage model was operationalised in order to classify each participating firm by growth stage'.

To develop the model, Smith and Gannon (1987) asked 31 entrepreneurs and professional managers from 27 firms to participate in the survey. The survey was designed to assess each organisation's stage of growth, and to identify indicators for effectiveness used by each entrepreneur/professional manager. In the part of the survey which focused on organisational effectiveness, managers were not asked to express the degree to which they agreed with predetermined indicators of OE, but rather they were asked to provide ten factors which they would consider important for effectiveness of their organisations. The managers generated a total of 279 commandments/indicators, which later were broken down into nine categories. These categories are: control, leadership, planning, knowing the business, perspective on change, communication, innovation, market orientation, and risk taking. After considering the relationship

between each of the nine categories and its importance at each stage of organisational growth, Smith and Gannon (1987, p. 19) confirm that 'in all three stages of organisational growth, the following categories proved to be most important: planning, control, leadership, and knowing the business intimately'.

Smith and Gannon (1987) draw three effectiveness profiles for three stages of firm growth. The first profile (in the entrepreneurial stage) indicates the most important commandments/indicators are leadership, planning, and knowing the business intimately. The second profile (in high-growth stage) emphasises the control indicator and de-emphasises the other aspects of effectiveness. The third and final profile of organisation effectiveness (in mature stage) focuses on the importance of leadership, knowing the business intimately, and communication.

Finally Smith and Gannon (1987, p. 21) conclude that the indicators of OE cannot be assumed constant through all stages of organisational life cycle and 'the criteria for organisational effectiveness are likely to change with different stages of organisational growth and development'.

#### **2.2.4.27. Ridley and Mendoza Model (1993)**

This model is designed to assist organisation consultants in accurately evaluating and measuring the effectiveness of organisations. Ridley and Mendoza (1993, p. 168) contend that:

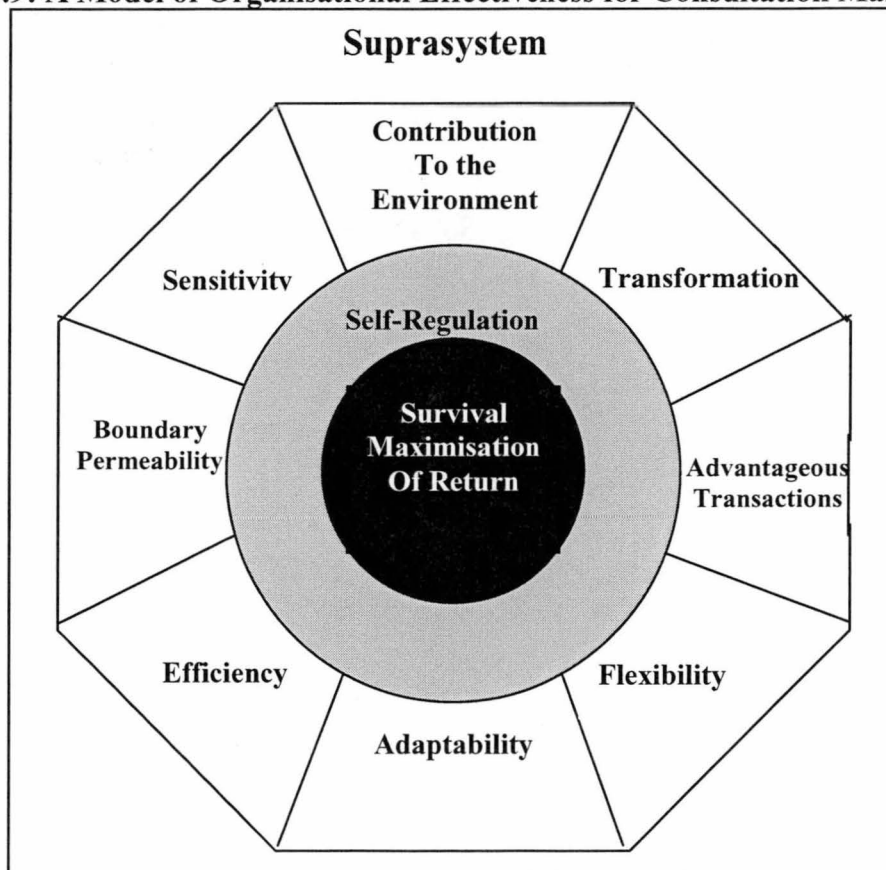
Consultants need a well-grounded conceptualisation of organisational effectiveness (OE). Such a conceptual framework must simplify the complexity of the total organisation, identifying general elements and processes that contribute to effective functioning and hypothesising how these systematically relate to one another. We believe that most consultants, unfortunately, have no such conception or a flawed conception of OE.

In this study, organisations are viewed as open systems and the creators attempt to present a model of OE that advances the utility of open systems theory. Ridley and Mendoza (1993) strongly support the open systems theory as still being the best framework available to assist consultants in conceptualising the total organisation, even though the full power of the theory to explain interactions at the system-suprasystems

level has not been exploited. Thus, an OE model, which utilises a complete application of open systems theory, might be helpful in conceptualising organisational functioning beyond the boundary of the organisation.

The model of OE presented by Ridley and Mendoza (1993) is composed of interrelated processes. These processes are conceptualised at a level where comprehension is not undercut by simplicity but enhances it. The model consists of a total of 11 processes contributing to OE (Figure 4.9).

**Figure 4.9: A Model of Organisational Effectiveness for Consultation Management**



Source: Adapted from Ridley and Mendoza (1993, p. 172)

Survival and the maximisation of return on contributions are selected as superordinate processes and placed at the centre of the model. The third most general and mediating process is self-regulation which orchestrates the movements of other processes. The remaining eight processes (subordinate processes)—boundary permeability, sensitivity, contributing to the environment, transformation, advantageous transactions, and efficiency—interact with each other and the three higher level processes (survival, maximisation of return, and self-regulation) (Ridley & Mendoza 1993).



Ridley and Mendoza (1993, p. 172) justify the selection of superordinate processes by stating:

...survival is necessary but not sufficient for OE. To be effective organisations must also maximise on return. Maximising not only increases the chances of survival but also promotes the progressive evolution that is the cornerstone of OE.

Ridley and Mendoza (1993, p. 172) defend the selection of the mediating process (self-regulation) as 'self-regulation is the primary responsibility of management, whose task it is to grasp the big picture of the overriding purpose and mission of an organisation and who must see to it that the "working parts" of the organisation are moving harmoniously to this end'.

The authors claim that the eight subordinate processes are selected from a universe of processes identified in the OE literature as relevant to organisational functioning. Ridley and Mendoza (1993, p. 173) rationalise the selection of these processes as:

They are applicable to all organisations...interrelated to one another systematically, but...are clearly identifiable as separate processes. Finally the processes selected are considered to be the most critical to the maintenance of the superordinate processes.

After developing this model, Ridley and Mendoza (1993, p. 172) define organisational effectiveness as 'the strategic balancing of priority given to the processes of survival and maximisation of return over the long term'.

According to Ridley and Mendoza (1993), this multidimensional model is developed to bring together systems theory, organisational theory, and consultation theory. In addition, in their view, it is a unique model in that it is designed to apply to all kinds of organisations. However, examination of previous models indicates that a number of models are designed to apply to all types of organisations.

#### **2.2.4.28. Thibodeaux and Favilla Model (1996)**

This model draws a link between organisational effectiveness and strategic management. Thibodeaux and Favilla (1996, p. 21) define organisational effectiveness

as ‘the extent to which an organisation, by the use of certain resources, fulfils its objectives without deleting its resources and without placing undue strain on its members and/or society’.

Thibodeaux and Favilla (1996) utilise ten concepts of organisational effectiveness—conflict, customer, flexibility/adaptation, information management and communication, morale, planning and goal setting, productivity, quality, urgency, and value of human resources—and attempt to relate these concepts to the processes of strategic management. In this respect, they (p. 23) suggest:

Although there is relative consensus that the basic reason for strategic management is to improve organisational effectiveness, little agreement exists on how to evaluate effectiveness and how strategic management impacts organisational effectiveness. This study attempts to relate the concepts of organisational effectiveness (OE) and the processes of strategic management (SM).

The authors carried out three structured questionnaire surveys (with seven months interval between each) with the management team in order to measure the perceived relationships between ten OE concepts and strategic management processes. The aims of these data collections were, first to rank order the ten concepts, and second to verify or deny whether the organisation being observed did what they said they did in the context of organisational effectiveness and strategic management.

The results of the surveys show that there was high consistency among the ten OE concepts and how they were related by the management team. Thibodeaux and Favilla (1996, p. 24) draw two conclusions:

First, the organisation under observation did behave by doing what it said it did. The expressed goals (what the organisation says it is doing) matches [*sic*] its operative goals (what the organisation is actually doing). The customer both in theory and practice was number one. The second conclusion is that the strategic management processes related to planning, namely flexibility and goal setting, were in combination [with] the highest rated of the five strategic management processes—[planning, analysis, decision making, implementation, and evaluation].

#### **2.2.4.29. Summary of the OE Models**

As noted from the review, most of the past models of OE are, one way or another, based on open systems theory. More than half of the 49 models, which have been considered influential and satisfied the necessary guidelines for inclusion in this review, utilised the principles and framework of systems theory in defining effectiveness and conceptualising an appropriate OE model.

Because the primary objective of this chapter was to identify a comprehensive list of OE criteria, a review of 49 multidimensional OE models resulted in the extraction of a total of 78 criteria that can be used as a menu for building an appropriate model for OE assessment in seaport organisations. These criteria are tabulated against the models from which they have been extracted and are at Appendix 1.

### **3. Summary**

This chapter was devoted to the ideology of Organisational Effectiveness (OE) in organisation theory. It was revealed that although there is a certain amount of empirical literature dealing with organisational effectiveness and its measures, the organisation theorists have not been able to reach a consensus over what constitutes a valid set of effectiveness criteria. It was also found that the early approaches to OE were unidimensional—using only one criterion to assess the effectiveness of organisations. This approach has been replaced by more recent multidimensional models.

Initially a brief description of different categories of existing multidimensional models of organisational effectiveness—goal achievement, systems, and multiple constituency models, was presented. Then followed an in-depth and more detailed review of some selected models. The logic behind this review was firstly to comprehend the underlying concept of OE from different point of views, and secondly to extract the OE criteria of these models and produce a menu that helps building an appropriate model for OE assessment in seaport organisations.

Finally, in addition to finding a total of 78 effectiveness criteria from reviewing 49 existing OE models, it was revealed that the systems framework (input-transformation-output) was, comparatively, the most commonly used approach for OE model-building.

The following chapter will use the findings of this chapter firstly to identify the OE criteria appropriate to Iran's seaports organisation, and secondly to generate a model of OE, with the identified criteria, suitable for assessing effectiveness of Iranian seaports organisations.

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## **Chapter 5**

# **Generating an OE Model for Seaport Organisations**

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### **1. Introduction**

The search of the literature on Organisational Effectiveness (OE) proved that no model of OE for specifically assessing the effectiveness of seaport organisations exists, and no empirical research on the organisational effectiveness of seaport organisations in general, and Iran's PSO in particular, has taken place in Iran or elsewhere. Therefore, this chapter predominantly aims to deduce a supportable result from the survey of the literature presented in earlier chapters (i.e. 2, 3, and particularly the findings of chapter 4), by conceptualising a model for the regular assessment of OE in Iran's seaports organisation. Further, it summarises the implications of the reviewed literature for further research on the OE of Iran's PSO.

It is important to note that prior to any attempt to conceptualise a model, 40 CEOs of world leading seaport organisations (i.e. in terms of total volume of cargo handled per year) were approached to firstly ascertain that no OE model suitable for seaport organisations exists in the industry, and secondly to include their opinions in the process of OE model-building. They were asked whether they assess OE in their organisation or not, and if they do, what criteria they utilise in their assessment. The responses indicated that the industry is in need of a model for regular assessment of OE, because the majority of organisations were not even familiar with the concept of OE or its criteria. In particular, OE was mostly confused with the Operational Performance (OP) of seaports. Therefore, to clarify this confusion the next section will make a distinction between the most fundamental components of an organisational assessment process: effectiveness and performance.

## **2. Effectiveness of Seaport Organisations (A Distinction between Operational Performance Monitoring Through KPIs and OE of Seaport Organisations)**

For the purpose of this research, a clear distinction has been drawn between the effectiveness of an organisation and the performance of its operation. These are two important issues which are often confused with each other. Although the effectiveness of a system (organisation) and its performance are closely related and usually indiscriminately interchanged, there are differences between them (and their measures) that need to be explored. The effectiveness of seaport organisations is a core objective of this research and, thus, concentrates on the organisation section of seaports rather than their operations. Revealing these differences not only will serve to enhance the understanding of the role of effectiveness but will also serve to illustrate the source of confusion between these two terms.

Oxford (2003) defines performance as ‘the act of performing; how well or badly something works; the act or process of performing a task, an action, etc’. Cambridge (2004) has a similar definition and states that performance is ‘how well a person, machine, etc. does a piece of work or an activity’. This is confirmed by Webster (2004) when it describes performance as ‘the execution of an action; something accomplished; the fulfilment of a claim, promise, or request; the ability to perform; the manner in which a mechanism performs’.

Similarly, the word effective is defined by Oxford (2003) as ‘producing the result that is wanted or intended; producing a successful result’. Cambridge (2004) also defines effective as ‘successful or achieving the results that you want;...[and] effectiveness [as] how successful it is...’. Webster (2004) also confirms these definitions by defining effective as ‘producing a decided, decisive, or desired effect; producing or capable of producing a result. “Effective” stresses the actual production of or the power to produce an effect’.

A simple comparison between these two sets of definitions discloses the important differences between effectiveness and performance, and between their indicators in the

context of an organisation. Both terms refer to the quality of accomplishing a job, but in different ways. Effectiveness refers to the quality of producing intended results, whereas performance only refers to the quality of performing something without considering the achievement of intended results.

This view is perfectly expressed by Sproles (2000, 2001a, 2001b) who proposes the difference and distinction between effectiveness and performance as applied to a solution to a need. Essentially he suggests that 'effectiveness' is a quality of fitness for service or of producing the results for which it was intended; and 'performance' is the quality of doing something, and doing something does not necessarily indicate fitness for service. This is to say that unlike effectiveness, doing a piece of work or activity (performance) does not require it to be connected with the quality of something being fit for service or of it achieving the results for which it was intended. In general terms, as Sproles (2001a) appropriately states, effectiveness is the domain of the end user who wishes to know if a system is able to meet a need.

Consequently, as these two important issues have fundamental differences, there are also considerable differences in their measures or indicators. The qualities of effectiveness and performance are two separate entities in that the Measures Of Effectiveness (MOEs) refer to the stakeholders' intentions whereas the Measures Of Performance (MOPs) (also known as Key Performance Indicators, KPIs) are concerned with actual performance, which may be divorced from the stakeholders' intentions (Sproles 2000). In other words, indicators of effectiveness are concerned with how well the solution performs the intended purpose while KPIs look at what a particular solution does regardless of its intended purpose (Sproles 2001a). Therefore, it can be said that measures of effectiveness are mission or purpose oriented, represent a standard or yardstick against which a solution may be judged, and/or are a reflection of the stakeholders' standards for success.

Another difference between effectiveness indicators and KPIs is related to their quantifiability. Effectiveness indicators can either be quantified (or are capable of eventual quantification) or unquantified, but KPIs must be quantifiable if they are going to be of any value to organisations, and thus are not applicable to all cases (Reh 2004).

To further illustrate the difference between indicators of effectiveness and KPIs as applied to port industry, a project involving increasing the throughput of a port system can be considered. It may be decided to base the indicator of effectiveness on 'profitability'. It is not dependent to any one solution. It is predicted on the basis that there will be more profit if the throughput is increased. It does not define 'throughput' in terms of the exact volume/weight of cargo to be handled etc., yet it provides a definitive standard for output.

In this case, indicators such as volume/weight of cargo loaded and discharged, transportation and handling costs, percentage reduction in turnaround time, percentage reduction in ships' waiting time, vessels schedule integrity, consignment security, transit time, etc. are all KPIs as they relate to what in fact is achieved. These may be of use to those involved in the process of port operations, but for those instigating throughput, the ability of the port organisation to increase profit is seen as a better indicator and more usefully represents their objectives. Telling the stakeholders that X tonnes of cargo have been handled will not necessarily achieve the same result. The handling of cargo alone may not increase the profit and, in any event, how much cargo would it be necessary to handle? The real profit of the organisation (or, in general, indicators of effectiveness) will tell how the project succeeded. The volume/weight of cargo handled etc. (KPIs) only tells what work was done and is not necessarily relevant to the purpose of the project. It may have been necessary, but it was incidental to the mission. Another solution may have resulted in the profit being increased without handling any cargo at all. Consequently reaching the standards set by indicators of effectiveness may influence the choice of right KPIs for monitoring and measuring the operational performance, or may necessitate the selection of particular KPIs.

The intention of this research is not to search for KPIs and measure the operational performance of seaports, but to identify the key indicators of effectiveness for organisation sector of seaports. This is based on the belief that identifying correct OE indicators will also enhance operational performance.



### **3. Assessing Effectiveness of Iran's Seaports**

#### **Organisations: Conceptualising a Hypothetical OE Model**

The potential impacts of transport on development were discussed in Chapter 2, and it was concluded that the importance, operationality, and performance of seaports is crucial to the flow of trade and ultimately to the development of Iran's transport systems and the country as a whole. The efficiency of seaports, as an integral part of a nation's transport network, is thus a matter of some importance to users, providers and policy makers alike. It was also revealed that port efficiency and performance is a well researched and documented area however, the effectiveness of a port's organisation is not (Chapter 3). Consequently, an in-depth review of the literature pertaining to OE and its constructs was presented in Chapter 4, with the aim of finding an appropriate approach for the assessment of effectiveness in seaport organisations. The detailed review of available OE models in that chapter failed to find any OE model specifically designed and developed for seaport organisations. Therefore, this section aims to generate a hypothetical model of OE applicable to seaport organisations, based on the belief that the effectiveness of seaport organisations and management is one of the main building blocks upon which the operational performance of seaports is based.

In view of the fact that seaport organisations, as an element of the transportation network, are not involved in the production of goods in any form and solely provide services, they can be clearly categorised as Service Industry (SI) organisations. Much has been written about how successful ports might manage and market their business, how to improve their operational performance, and how to measure KPIs, but nothing appears to have been done in the way of assessing organisational effectiveness for service-oriented seaport organisations.

Measuring effectiveness in service-oriented organisations is particularly difficult because of the dynamics involved in customer participation (Bowen & Jones 1986). The whole process of service-oriented firms is affected by customers' participation in the receipt of service. Further, 'what makes measurement so difficult is that service firms must "count outputs" which are intangible' (Kraft et al. 1996, p.105), and which are

produced and consumed simultaneously. That is, services perish when produced such that they cannot be counted, inventoried, or tested.

Despite these characteristics, which contribute to the difficulty of assessing how effectively service organisations perform, this research strives to identify key criteria influencing the organisational effectiveness of seaports. Based on identified criteria, a multidimensional Organisational Effectiveness (OE) model will be developed to facilitate the measurement of OE in port organisations. As the literature illustrates, it is highly probable that if accurate indicators of OE are utilised in the model, the result of the assessment will more precisely indicate the status of the port organisation in terms of effectiveness. That, in turn, can be used as a guide to enhance the effectiveness of the organisation in the future.

The result of literature review shows that the effectiveness of seaport organisations has not been previously studied, and no model of OE suitable for seaport organisations exists in the literature. Therefore, creation of an OE model applicable to seaport organisations is based on existing models of OE in the literature that was reviewed in the preceding chapter.

As discussed in the earlier chapter and as summarised in Appendix 1, only 49 OE models could satisfy the set guidelines. These were elaborated, reviewed in-depth, and compared with the intention of finding a comprehensive compilation of effectiveness criteria. Ultimately, a total of 78 criteria of organisational effectiveness were derived from these models. These criteria are tabulated in Table 5.1, while Table 5.2 summarises a brief definition of each criterion. Table 5.1 also compares the frequency with which each of the 78 evaluation criteria is utilised in the 49 models (frequency of occurrence).

**Table 5.1: OE Indicators in 49 Models of Organisational Effectiveness and Their Frequency of Occurrence (F)**

No.	Evaluation Criteria	F	No.	Evaluation Criteria	F
1	Productivity	11	40	Human behaviour	1
2	Resource acquisition	10	41	Public values of Management	1
3	Efficiency	10	42	Absence of strain	1
4	Adaptability	9	43	Reduction In economic power concentration	1
5	Profitability	7	44	Employee enhancement	1
6	Flexibility	7	45	Coping with uncertainty	1
7	Planning	6	46	Substitutability	1
8	Output quality	5	47	Centrality	1
9	Morale	5	48	Organisational instrumentality	1
10	Processes	5	49	Organisational Satisfaction	1
11	Growth	4	50	Organisational location	1
12	Cohesion	4	51	Time dimension	1
13	Human resource development	4	52	Detailed knowledge	1
14	Information management	4	53	Taxonomy	1
15	Goal attainment	4	54	Causal linkages	1
16	Stability	3	55	Capability of reconstructing input	1
17	Control	3	56	Sensitivity to complexity	1
18	Outcomes	3	57	Ability to keep disagreement tacit	1
19	Control over environment	3	58	Reputation	1
20	Communication	3	59	Autonomy	1
21	Institutionalisation	2	60	Turnover	1
22	Survival	2	61	Power	1
23	Goal optimisation	2	62	Consolidation	1
24	Reliability	2	63	External environment	1
25	Sensitivity to change (ext. & int.)	2	64	Strategy	1
26	Structures	2	65	Demographics	1
27	External support	2	66	Finances	1
28	Readiness	2	67	Leadership	1
29	Objective setting	2	68	Knowing the business	1
30	Evaluation	2	69	Maximisation of return	1
31	Self-maintaining	1	70	Self-Regulation	1
32	Organisation's worth	1	71	Contribution to the environment	1
33	Sense of identity	1	72	Boundary permeability	1
34	Capacity to test reality	1	73	Conflict	1
35	Conformity	1	74	Customer satisfaction	1
36	Storage	1	75	Productivity-support-utilisation	1
37	Employee satisfaction	1	76	Initiative	1
38	Social value	1	77	Cooperation	1
39	Integration	1	78	Staff development	1

Table 5.2: Brief Definition of OE Criteria

	Criteria	Definition
1	Productivity	The degree to which an organisation is productive in terms of goods or services;
2	Resource acquisition	The ability of an organisation to successfully interact with its environment to acquire scarce and valued resources necessary to its effective operation;
3	Efficiency	The ability of producing a desired result while minimising the expenditure of time, effort, and expense; or a ratio that reflects a comparison of some aspects of unit performance to the cost incurred for that performance;
4	Adaptability	The degree of responding to changing conditions (environmental and internal problems) and adapting to external stresses; or the ability to undergo longer lasting reorganisation in response to chronic environmental pressure that imposes continuous constraints on the organisation's operations;
5	Profitability	The degree to which an organisation is profitable after all costs and obligations are met;
6	Flexibility	The ability to undergo temporary reorganisation or adjustment under acute, non-routine pressure from the internal or external environments;
7	Planning	The degree to which the organisation is able to cope with emergencies and to concentrate upon the primary goal; or the degree to which an organisation systematically plans its future steps;
8	Output quality	The quality of the primary service or product provided by the organisation;
9	Morale	It is a group phenomenon involving extra effort, goal communality, commitment, and feelings of belonging;
10	Processes	Process measures are aimed at assessing quality of performance and quantity of activities performed;
11	Growth	An increase in such variables as total manpower, plant capacity, assets, sales, profits, market share, and number of innovations. It implies a comparison of an organisation's present state with its own past state;
12	Cohesion	Defined by an organisation in which the members like one another, work well together, communicate fully and openly, and coordinate their work efforts;
13	Human resource development	The amount of effort the organisation devotes to developing its human resources;
14	Information management	Completeness, efficiency, and accuracy in analysis and distribution of information;
15	Goal attainment	The degree to which the organisation appears to place a high value on achieving major goals;
16	Stability	The maintenance of structure, function, and resources through time, and more particularly, through periods of stress;
17	Control	The degree of, and distribution of, management control that exists within an organisation;
18	Outcomes	Specific characteristics of materials, objects, or services on which the organisation has performed some operation
19	Control over environment	Adaptation to environment through controlling the elements of environment;
20	Communication	Free flow of work information and communication within the organisation;
21	Institutionalisation	It refers to the level of organisation or structuring of the actor (e.g. suppliers' cooperatives, consumer associations)
22	Survival	The extent to which the efforts are directed towards sustainability and survival of an organisation; to be effective, organisations first must survive; to survive. Organisations must store reserves of energy (storage of energy)
23	Goal optimisation	Optimised goals are what an organisation is capable of attaining;
24	Reliability (in performance of employees)	The extent to which personnel meeting organisation's objectives without the necessity of follow-up or checking;
25	Sensitivity to change	It is the organisation's "intelligence" process. It involves timely communication of information concerning changes in the internal & external environments and helps organisations to adapt;
26	Structures	It includes all measures based on organisational features or participant characteristics presumed to have an impact on organisational effectiveness;

**Table 5.2: Brief Definition of OE Criteria (Continued)**

	<b>Criteria</b>	<b>Definition</b>
27	<b>External support (support from government)</b>	The degree to which an organisation being supported by government; or government's interest in and concern for well-being of the organisation;
28	<b>Readiness</b>	An overall judgement concerning the probability that the organisation could successfully perform some specified task if asked to do so;
29	<b>Goal setting</b>	The degree to which an organisation engages in explicit goal-setting behaviour;
30	<b>Evaluation by external entities</b>	Evaluations of organisation, or unit, by the individuals and organisations in its environment with which it interacts (e.g. suppliers, customers, stakeholders, enforcement agencies, and the general public);
31	<b>Self-maintaining</b>	The degree to which the organisation maintains or expands itself;
32	<b>Organisation's worth</b>	The degree to which the organisation is of value to its members, and the organisation and its members, in turn, are of value to society (the worth of the organisation to the individual members and the worth of both individual members and organisation to society); or the ability of a system to maintain itself by returning human benefit in sufficient degree to induce participant cooperation;
33	<b>Sense of identity</b>	The extent to which the organisational goals are understood and accepted by personnel;
34	<b>Capacity to test reality</b>	An ability of the organisation to correctly identify problems posed by environment and their solutions for successful adaptation over the relevant environments;
35	<b>Conformity (or compliance)</b>	The degree to which performance responds to norms of a social system;
36	<b>Storage (of energy)</b>	The ability of an organisation to reserve funds, as capital funds for expansion, as funds for replacement of equipment and for various kinds of emergencies; or to stockpile materials;
37	<b>Employee satisfaction</b>	The degree to which an organisation satisfies its members;
38	<b>Social value</b>	The degree to which an organisation is of value to the larger society of which it is a part;
39	<b>Integration</b>	How completely members are being integrated into the system through clearly defined roles;
40	<b>Human behaviour</b>	The degree of acceptance of organisational goals by employees and their commitment towards goal achievement;
41	<b>Public values of management</b>	Managerial values with respect to the organisation's publics (national government, suppliers, customers, community, stockholders, creditors, and employees)
42	<b>Absence of strain</b>	The degree of (lack of) intra-organisational strain, or tension, and of conflict between organisational subgroups;
43	<b>Reduction in economic power concentration</b>	The extent to which each organisational group facilitated the dispersal of ownership and control;
44	<b>Employee enhancement</b>	The extent to which each organisational group contributes towards the material and professional well-being of its workers;
45	<b>Coping with uncertainty</b>	Ability of the organisation to cope with future uncertainty imposed by environmental elements (e.g. technology);
46	<b>Substitutability</b>	The degree of replaceability of suppliers or customers from the organisation point of view;
47	<b>Centrality</b>	The importance and degree of connectivity of suppliers or customers to the organisation;
48	<b>Organisational instrumentality</b>	Human behaviour in perceiving organisations as instruments to achieve goals; the greater the degree of perceived organisational instrumentality by each employee, the more effective the organisation;
49	<b>Organisation satisfaction</b>	The ability of constituencies to recognise, develop, and exercise power so as to shift the distribution of satisfactions in their favour;
50	<b>Organisational location (domain shifting)</b>	The degree to which an organisation is able to change its constituencies by changing the products and services they offer, the type of client or geographical region served (domain shifting);
51	<b>Time dimension (timely planning)</b>	The ability of an organisation to timely plan (making right decision or plan at right time); also, operations planned & scheduled to avoid lost time;

**Table 5.2: Brief Definition of OE Criteria (Continued)**

	<b>Criteria</b>	<b>Definition</b>
52	<b>Detailed knowledge</b>	The extent of detailed knowledge about the environment for making right decisions; or an organisation is effective to the degree that it is grounded in more detailed knowledge of the data;
53	<b>Taxonomy</b>	The ability of a system to utilise a classification scheme of any kind. A system that permits more gradations generates more accurate predictions;
54	<b>Causal linkages</b>	The power of an organisation to understand the causal linkages among different categories of information;
55	<b>Capability of reconstructing input</b>	The ability to reconstruct or reverse unproductive lines of action and unproductive solutions. Accurate reconstruction of original details makes it possible to build a second interpretation (solution) that may handle the original, or newer, problems just as well;
56	<b>Sensitivity to complexity</b>	Diagnoses & remedies based on tradeoffs among generality, accuracy, & simplicity are clues to the existence of self-correcting systems;
57	<b>Ability to keep disagreement tacit</b>	Coercive agreement on a smaller number of more general themes by members;
58	<b>Reputation</b>	An organisational identity, which includes everything that the organisation does; it reflects behaviour exhibited everyday through numerous decisions;
59	<b>Autonomy</b>	Autonomy in work and workplace in terms of ownership, control and decision-making;
60	<b>Turnover</b>	A measure of the relative number/rate of voluntary terminations, which is always assessed via archival records;
61	<b>Power</b>	The degree of power/authority for fulfilling organisational objectives;
62	<b>Consolidation</b>	The extent to which an organisation achieves its consolidation objectives of consensus, cohesion, communicative and functional integration;
63	<b>External environment</b>	This includes turbulence, complexity, richness or munificence, and supportiveness;
64	<b>Strategy</b>	This includes major area of strategic orientation, proactivity of strategies, and internal versus external focus;
65	<b>Demographics</b>	This includes size, location, unionism, percent of tenured personnel,...;
66	<b>Finances</b>	This includes internal expenditure patterns, revenues from sources such as federal and state governments and foundations, endowments, and acquisition of revenues;
67	<b>Leadership</b>	The importance of providing direction and a vision of the future both to organisational members and members of the organisation's external environment;
68	<b>Knowing the business (professionalism)</b>	The extent of knowledge about the industry, the organisation and its members, and the organisation's problems before taking action;
69	<b>Maximisation of return</b>	Return on monetary investment, or any beneficial return on contribution;
70	<b>Self-regulation</b>	It serves as a coordinator, orchestrating the movements of other processes (e.g. managing the processes of goal attainment within different subsystems) and balancing the resources allocated to survival and maximisation of return over time;
71	<b>Contribution to environment</b>	The ability of producing outputs and ensuring that the outputs of the organisation are received by external and internal constituents of the organisational systems;
72	<b>Boundary permeability</b>	The degree of flow of information and materials (inputs and outputs) between organisational units (moderately permeable internal and external boundaries are ideal)
73	<b>Conflict</b>	The extent of verbal and physical clashes, poor coordination, and ineffective communication;
74	<b>Customer satisfaction</b>	The degree to which an organisation satisfies its customers;
75	<b>Productivity-support-utilisation</b>	The ability to produce goods or services is related to supportive relationships within an organisation, and to the degree of manpower utilisation;
76	<b>Initiation/innovation &amp; creativity</b>	The degree of initiation of ideas and practices, and the degree of support these ideas (innovation & creativity) receive from organisation;
77	<b>Cooperation (cooperative behaviour)</b>	The degree of cooperative behaviour shared by staff members
78	<b>Staff development</b>	The amount of effort the organisation devotes to the continuing development of its members;

Source: Derived from different OE models

Although the wide range of criteria across the models may confirm the lack of consensus as to what constitutes a useful and valid set of effectiveness measures, adopting a supportable method of selection from the pool of criteria (i.e. 78) should result in an accurate measurement of effectiveness in seaport organisations (Sayareh & Grewal 2004).

The choice of OE indicators is the most critical decision in the process of effectiveness measurement, but having access to a range of criteria will simplify the process. Table 5.1 is designed as a menu to help in selecting a set of criteria that are considered to be the most significant and decisive to seaport organisations.

In the selection process and prior to conceptualising an OE model, in addition to the *applicability* (Are selected indicators applicable to the organisation?) and *measurability* (Can the selected OE indicators be measured by the organisation?) of the criteria (Sayareh & Grewal 2004), the following factors are to be considered when selecting OE indicators (Sproles 1999):

- OE indicators must address critical issues;
- OE indicators must be selected with the stakeholders and their domains in mind;
- OE indicators should take advantage of experience;
- OE indicators must be clearly expressed;
- OE indicators must be comprehensive and relevant;
- OE indicators must be quantifiable when possible;
- OE indicators must be able to be tested and evaluated; and
- OE indicators must refer to what is important, not to what is convenient.

As discussed in chapter 4, any systematic approach to assessing OE requires firstly to identify the specific and appropriate criteria for OE assessment and secondly to conceptualise a model of OE using the identified criteria. Therefore, to complete the process of OE model building, the following two main steps should be taken:

1. identification and selection of appropriate and relevant criteria; and

2. developing an appropriate OE model and clustering the selected criteria into the model.

These steps will be further discussed in the following two subsections.

### **3.1. Identification and Selection of Appropriate and Relevant Criteria**

As can be noted from Tables 5.1 and 5.2, the potential indicators vary on a number of dimensions. First, the list has a helter-skelter nature; there are too many of them, and no model of OE can be constructed with this many indicators (Campbell 1977). Second, some of the criteria overlap in their meaning and intentions. Third, most of the indicators vary fundamentally in terms of generality and specificity. Finally, there are considerable differences in terms of the methods used to operationalise these indicators (different indicators are derived from different OE models such as systems models, goal models, multiple constituency models, etc.). Therefore, in the process of criteria selection, it is important to organise and reduce the number of indicators to a manageable size.

One alternative, for the selection criteria process, is to be based on the frequency of occurrence of indicators—that is, selecting only those criteria with maximum frequency and/or excluding those criteria with a frequency of 1 or 2. Following this approach means the generalisability of the proposed OE model will be questionable and doubtful because the excluded criteria (with lowest frequency) might be more influential for the effectiveness of seaport organisations than some of those with higher frequency (e.g. autonomy, leadership... with a frequency of one)<sup>13</sup>.

Since there is no algorithm of science that will specify the indicators/variables that should be labelled as criteria of organisational effectiveness for a specific organisation (Campbell 1977), the process of criteria selection in this research will utilise a series of value judgements. Accordingly, purposive, or judgement sampling technique is found to be the most appropriate method of criteria selection (Zikmund 2003). Based on this

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<sup>13</sup> The objective here is not to deny the importance of frequency of occurrence, but to declare that it cannot be considered as a decisive factor in this research.



technique, a two-stage judgement approach is perceived to be a sound method to reduce and organise the list of 78 criteria (Quinn and Rohrbaugh 1981; 1983). In the first stage, the following decision rules are applied for elimination of any criterion which is (a) not at the organisational level of analysis; b) not a singular index but a composite of several criteria; (c) not measurable; (d) not practicable for or applicable to seaport organisations, and therefore irrelevant; (e) not very clear or not very important to the survival of seaport organisations; or (f) very general and broad. According to these rules, a total of sixteen criteria are found not to be very appropriate and are therefore eliminated. The results of the first stage of judgement (eliminated criteria) are summarised in Table 5.3.

**Table 5.3: Irrelevant/unmeasurable/inapplicable OE Indicators (or indicators that partially been represented by other representative OE Indicators)**

No.	Unusable OE Indicators
1	Organisational location (domain shifting)
2	Taxonomy
3	Causal linkages
4	Capability of reconstructing input
5	Sensitivity to complexity
6	Processes
7	Substitutability
8	Centrality
9	External environment
10	Storage
11	Institutionalisation
12	Structures
13	Reputation
14	Strategy
15	Demographics
16	Organisation satisfaction

In the second stage, the similarity between every possible pairing/grouping and combination of the remaining criteria is evaluated through a systematic sequence of comparison judgements<sup>14</sup>. The emphasis is placed on the principle that judgements are to be made upon the similarity and dissimilarity of indicators' meanings and intentions—that is, the conceptual similarity and dissimilarity of the criteria rather than upon the likelihood that two or more criteria would co-vary across organisational settings. As a result of this stage of judgement, a total of 49 indicators were compared,

<sup>14</sup> Again in defence of this strategy for combining few criteria into one, the thought of Campbell (1977, p.23) is borrowed, who states 'criterion combination is quite properly based on value judgments, and there is no algorithm or higher order truth to which we can appeal'.

matched and then clustered into a number of sets. Then each set is represented by one criterion (representative indicator) that has the highest frequency or is more dominant and meaningful to seaport organisations. Consequently, a total of fifteen indicators (sets) were selected (as representatives of 49 criteria) by this stage of judgement. These fifteen indicators are tabulated in Table 5.4.

Finally, it was found that the remaining 13 important and relevant indicators (out of 78 indicators) cannot be matched with any other indicators on the basis of their functionality and purpose; therefore they are labelled as singular important indicators of OE. These indicators are listed in Table 5.5.

Conclusively, out of 78 criteria, a sum of 28 (last column of Tables 5.4 and 5.5) indicators are found to be important, relevant, practicable, effective, decisive, and applicable to seaport organisations and can be utilised to construct an appropriate model of OE. In other words, a thorough critical examination of available criteria on OE resulted in the discovery of related constructs and conceptual schemes that can be used to describe organisational effectiveness. These criteria, with their cumulative frequency of occurrence, are shown in Table 5.6. An interesting result that can be concluded from this list is that, although the frequency of occurrence was assumed not to be a decisive factor in the selection criteria process, the list is dominated by those criteria with the highest frequency and only six criteria with lowest frequency (out of 48 criteria with frequency of one) managed to enter the list.

**Table 5.4: Combining important/relevant OE indicators based on similarity of their meanings and intentions (F: Frequency; C.F: Cumulative Frequency)**

No.	OE Indicators	F	Representative OE Indicators	C.F	No.
17	Productivity	11	Productivity	13	1
18	Productivity-support-utilisation	1			
19	Contribution to environment	1			
20	Autonomy	1	Autonomy	6	2
21	Power	1			
22	Control	3			
23	Reduction in economic power concentration	1	Adaptability	15	3
24	Adaptability	9			
25	Control over environment	3			
26	Sensitivity to change	2	Profitability	9	4
27	Capacity to test reality	1			
28	Profitability	7			
29	Finances	1	Flexibility	10	5
30	Maximisation of return	1			
31	Flexibility	7			
32	Coping with uncertainty	1	Output/outcomes quality	8	6
33	Readiness	2			
34	Output quality	5			
35	Outcomes	3	Human resource development	7	7
36	Human resource development	4			
37	Staff development	1			
38	Employee enhancement	1	Information management & communication	8	8
39	Cooperation (cooperative behaviour)	1			
40	Information management	4			
41	Communication	3	Organisation's worth (social & public values of management and individuals)	3	9
42	Boundary permeability	1			
43	Organisation's worth	1			
44	Social value	1	Stability	5	10
45	Public values of management	1			
46	Stability	3			
47	Integration	1	Knowing the business (professionalism)	2	11
48	Consolidation	1			
49	Knowing the business	1			
50	Detailed knowledge	1	Absence of strain and conflict/Cohesion	7	12
51	Absence of strain	1			
52	Conflict	1			
53	Cohesion	4	Human behaviour (employees' commitment to goal achievement)	3	13
54	Ability to keep disagreement tacit	1			
55	Human behaviour	1			
56	Sense of identity	1	Planning	12	14
57	Organisational instrumentality	1			
58	Planning	6			
59	Goal setting	2	Growth	7	15
60	Goal optimisation	2			
61	Self-regulation	1			
62	Time dimension (timely planning)	1	Growth	7	15
63	Growth	4			
64	Survival	2			
65	Self-maintaining	1			

**Table 5.5: List of singular important/relevant OE indicators that could not be matched (F: Frequency; C.F: Accumulative Frequency)**

No.	OE Indicators	F	Representative OE Indicators	C.F	No.
66	Resource acquisition	10	Resource acquisition	10	16
67	Efficiency	10	Efficiency	10	17
68	Morale	5	Morale	5	18
69	Goal attainment	4	Goal attainment	4	19
70	Evaluation	2	Evaluation	2	20
71	Reliability	2	Reliability	2	21
72	External support	2	External support	2	22
73	Employee satisfaction	1	Employee satisfaction	1	23
74	Customer satisfaction	1	Customer satisfaction	1	24
75	Turnover	1	Turnover	1	25
76	Leadership	1	Leadership	1	26
77	Initiation/innovation	1	Initiation/innovation	1	27
78	Conformity (or compliance)	1	Conformity	1	28

**Table 5.6: Final OE Indicators Applicable to Port Organisations and Their Cumulative Frequency of Occurrence**

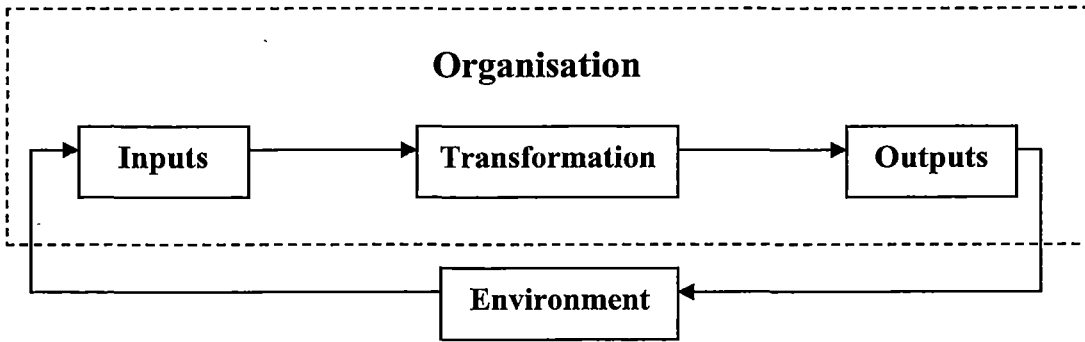
No.	OE Indicators	C.F
1	Productivity	13
2	Autonomy	6
3	Adaptability	15
4	Profitability	9
5	Flexibility	10
6	Output/outcome quality	8
7	Human resource development	7
8	Information management & communication	8
9	Organisation's worth	3
10	Stability	5
11	Professionalism	2
12	Cohesion	7
13	Human behaviour	3
14	Planning	12
15	Growth	7
16	Resource acquisition	10
17	Efficiency	10
18	Morale	5
19	Goal attainment	4
20	Evaluation	2
21	Reliability	2
22	External support	2
23	Employee satisfaction	1
24	Customer satisfaction	1
25	Turnover	1
26	Leadership	1
27	Initiation/Innovation	1
28	Conformity	1

### **3.2. Proposition of an Appropriate OE Model and Clustering the Selected Criteria into the Model**

The second and final step of model generation is the conceptualisation of an appropriate OE model and clustering the identified criteria into the model. For this purpose, a fundamental decision to be made is which multidimensional approach (i.e. goal attainment model, systems model or multiple constituency model) is more effective and proper for this research, and eventually suitable for clustering the identified criteria.

As concluded in previous chapter, the systems framework (input-transformation-output) was the most commonly used approach for OE model-building, as compared to all other available perspectives. Therefore, based on the fact that most influential and recognised models of OE are based on this approach, the systems perspective of multidimensional OE models is proposed for this research, as the appropriate approach to the final stage of model building. Unlike other approaches (e.g. goal-attainment) that examine information on the attainment of desired ends, systems models or value free models view the organisation as a whole, focus on information related to organisational processes, and concentrate on the means (not ends) necessary to ensure the organisation's viability and survival (Robbins & Barnwell 1994; Zammuto 1982).

In addition to the advantages of systems models over other models of effectiveness that were discussed in an earlier chapter, the systems approach is easily understood by all stakeholders as a means of representing a model of OE. This is because, the model is based on a simple process of inputs-transformation-outputs (Figure 5.1). Furthermore, with the assumption that all organisations (including seaport organisations) are systems, a systems model of OE can be generalised to any other seaport organisation as well as Iran's PSO; subject to the selection of relevant criteria and appropriate clustering.

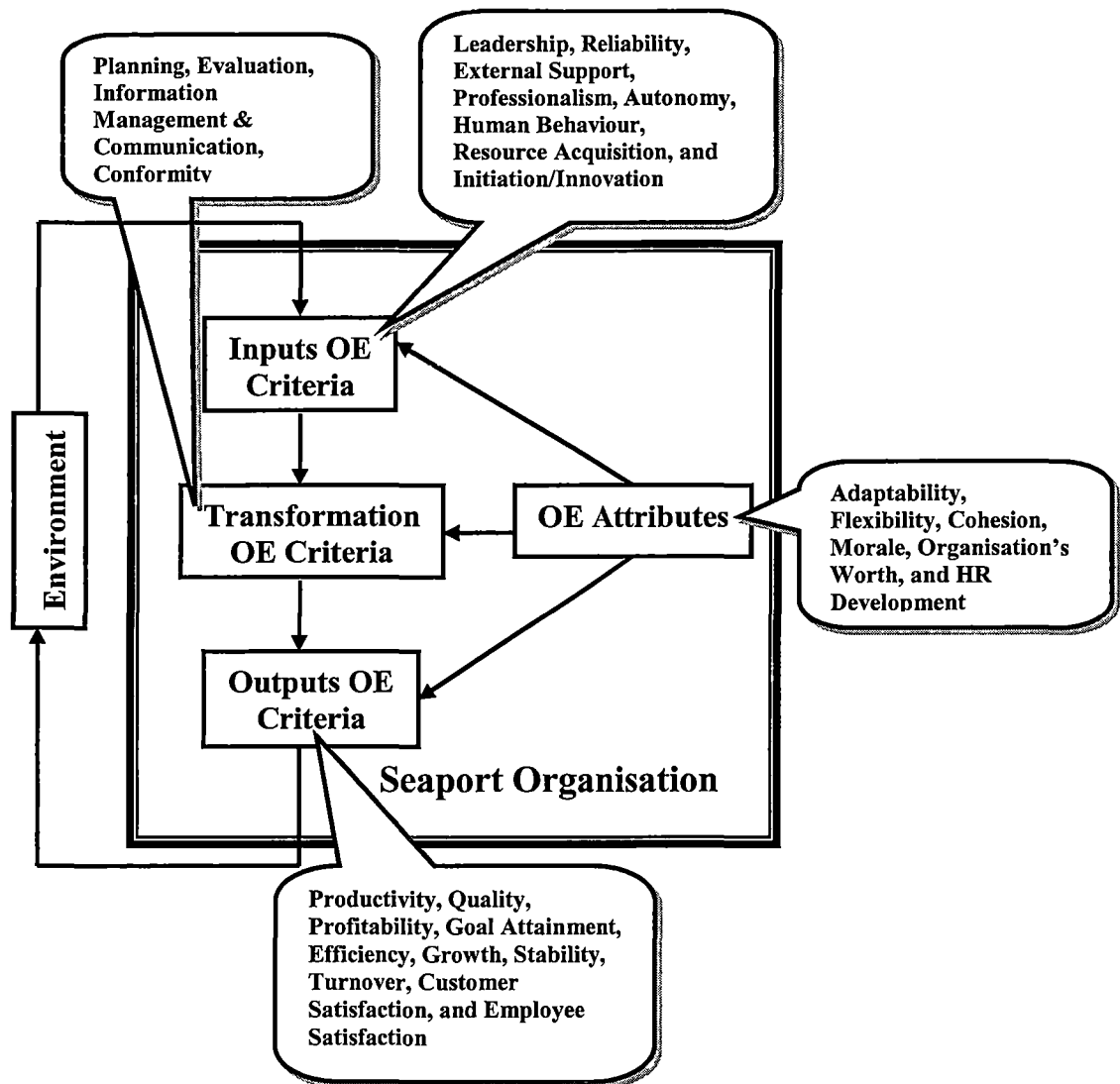
**Figure 5.1: A Basic Open Systems Model of Organisations**

The final 28 effectiveness criteria from Table 5.6 are again grouped into specifically related components and arranged into a systems format. The principles used to scatter the OE criteria across the model are those of systems theory (input/output transaction). That is, an organisation acquires inputs (resources) from the external environment, processes them (transformation or throughput) into services and products (outputs or outcomes), and returns them to the external environment. Therefore, the OE criteria can be grouped into the following components:

1. Input criteria: consist of those criteria that are important and necessary for effective exploitation of the external environment in gaining resources;
2. Throughput criteria: consist of those OE criteria that are important and necessary for effective transformation of inputs into outputs;
3. Output criteria: consist of those indicators that are necessary for viability, vitality and the well-being of the organisation; and
4. OE Attributes (common criteria): consist of those OE measures that are important and necessary for effective processes of all three functions (input-transformation-output) of a system.

The schematic representation of this hypothetical model is depicted in Figure 5.2.

Figure 5.2: A Hypothetical System-based Model of OE for Port Organisations



The uniqueness of this hypothetical model lies firstly in the absence of an OE model for seaport organisations in the literature, secondly in the synthesis of the criteria, which have been derived through a critical examination of the available literature on OE, and thirdly the arrangement of these criteria in a systems format. Although authors from whom these ideas are borrowed may not agree with the reinterpretation of their concepts, their influence must be acknowledged. Those who have most influenced the construction of this model include Georgopoulos and Tannenbaum (1957), Etzioni

(1960), Katz and Kahn (1966, 1978) , Yachtman and Seashore (1967), Friedlander and Pickle (1968), Mott (1972), Duncan (1973), Steers (1975, 1976, 1977), Evan (1976), Stewart (1976), Pennings and Goodman (1977), Cunningham (1978), Zammuto 1982), Gaertner and Ramnarayan (1983), Quinn and Cameron (1983), Quinn and Rohrbaugh (1983), and Ridley and Mendoza (1993).

Finally, based on an amalgamation of OE definitions from these well-known authors and as a result of the conceptualised OE model generated by this research, it can be said that seaport organisations, as systems in a service industry, are effective to the extent to which they successfully acquire needed resources (effective input criteria), process them (effective transformation criteria), and produce desired services (effective output criteria) with the aid of OE attributes.

#### **4. Implication of the Literature Review for Research on Effectiveness of Iran's Seaports Organisations**

The preceding literature review (Chapters 2, 3, 4, and the current Chapter) reveals the following major issues:

1. The possible impacts of transportation in general, and maritime industry in particular, on national development. This was mainly discussed with particular reference to developing countries as tools in securing competitive advantages;
2. The importance of seaport organisations and the role they play in development by analysing different types of seaport management and administration, which was narrowed down to the current practices in the organisation of Iran's seaports;
3. The importance of organisational effectiveness by reviewing existing models of organisational effectiveness and their implications for service industry organisations; and
4. Finally, the absence of any solid and concrete model of OE for measuring the effectiveness of seaport organisations. This, in fact, is perceived to be a gap in the literature.

While the current literature looks at different aspects of organisational effectiveness, and presents different models and a wide range of criteria for assessing OE in different



organisations ranging from manufacturing to service organisations, no empirical research has been conducted to address the measurement and/or assessment of OE in seaport organisations. Therefore, the above four major issues led to development of a hypothetical model of OE for assessing organisational effectiveness in seaport organisations.

In addition to these issues, this research further seeks to quantitatively evaluate the different possible impacts of regular OE assessment in seaport organisations. Therefore, as the research setting is the seaport organisations and the organisations studied are PSO headquarters and all PSO branches in charge of six major Iranian seaports, and respondents are naturally PSO managers, the research also quantitatively studies the effect of managers' organisational location (different PSO branches), managers' ranks, and managers' educational levels on the ideas of regular OE assessment and its impacts.

In order to gain clarity in the area of the research, based on the issues that surfaced during the extensive literature review, the following research questions for this thesis are posed:

- Q1.** Why should the effectiveness of a seaport organisation be assessed/measured regularly? What is the relationship between this assessment and organisation location, managers' ranks and managers' education levels?
- Q2.** What are the possible positive impacts of improved operational performance of seaports on development, as a result of higher OE of their organisation? What is the relationship between these impacts and organisation location, managers' ranks, and managers' education levels?
- Q3.** How can the effectiveness of seaport organisations be assessed/measured? What are the appropriate criteria for assessing/measuring OE of Iran's seaports' organisation?

These research questions are investigated and addressed in this thesis.

## 5. Summary

As effectiveness is often confused with performance, this chapter drew some fundamental distinctions between these two important issues of organisational assessment and their indicators in the context of seaport organisations.

Based on the results of previous chapters' literature review, this chapter successfully, firstly identified key criteria (i.e. out of 78 OE indicators) influencing effectiveness of seaports organisations, and secondly conceptualised a multidimensional Organisational Effectiveness (OE) model incorporating the identified criteria to facilitate the assessment of OE in seaport organisations.

The process of criteria identification utilised a series of value judgement techniques to organise and reduce the list of 78 criteria. As a result, out of 78 criteria, a total of 28 indicators were found to be important, relevant, practicable, effective, decisive, and applicable to seaport organisations and were utilised to construct an appropriate OE model. Further, conceptualisation of an OE model was appropriately justified in that the proposed OE model for assessing seaport organisations' effectiveness is based on a systems perspective (inputs-transformation-outputs). Therefore, the identified 28 criteria were grouped into specifically related components and arranged into a systems format. That is, the systems theory principles (i.e. inputs/outputs transactions) were used to scatter the 28 identified OE criteria across the proposed model.

Finally, the chapter summarised the implications of reviewed literature for specific research on OE of Iran's PSO, and presented the research questions that stemmed from the literature review.

The next chapter will present the research methodology and design utilised by this study to address the research questions and hypotheses.

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# **Chapter 6**

## **Research Methodology and Design**

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### **1. Introduction**

To address the research questions raised, and to test the hypothetical model of OE described in chapter 5, a research framework is developed. This chapter aims to address this framework in terms of research methodology and the design utilised for this study. It also provides the description and justification for utilisation of each method. Furthermore, it focuses on survey methods that are developed for both qualitative and quantitative approaches. The chapter, particularly, details the step-by-step development of a questionnaire as the main technique of primary data collection for this study.

### **2. The Rationale of the Research Design**

One of the main aims of this research is to generate an appropriate model of Organisational Effectiveness (OE) for assessing the effectiveness of Iran's seaport organisation. This research did not begin with a theory, rather it began with a study of an area of organisational theory (organisational effectiveness) which then contributed to theory building. That is, the first part of this research adopted an inductive approach to theory building and not a deductive approach (Neuman 2003)—the theory is inductively derived from the study of phenomenon it represents (Straus & Corbin 1991).

The research questions stemmed from the literature review whilst the hypothetical OE model focuses mainly upon the “what, how and why” of OE in (Iran's) seaport organisation. These questions along with the developed hypothetical OE model can

posit a number of inferential theories or hypotheses (Creswell 2003) for further testing. These hypotheses are:

- H1.** The result of regular assessment of OE can be used to improve seaport organisation's effectiveness, regardless of its location, managers' ranks and managers' education levels.
- H2.** Greater seaports' operational performance, as a result of higher OE, will have positive impacts on development, regardless of their location, managers' ranks, and managers' education levels.
- H3.** The correct criteria for assessing OE in seaport organisations can be identified and grouped into a meaningful system-based model comprising an Input phase, a Transformation phase, an Output phase and OE attributes (common criteria).

## 2.1. Operational Hypothesis<sup>15</sup>

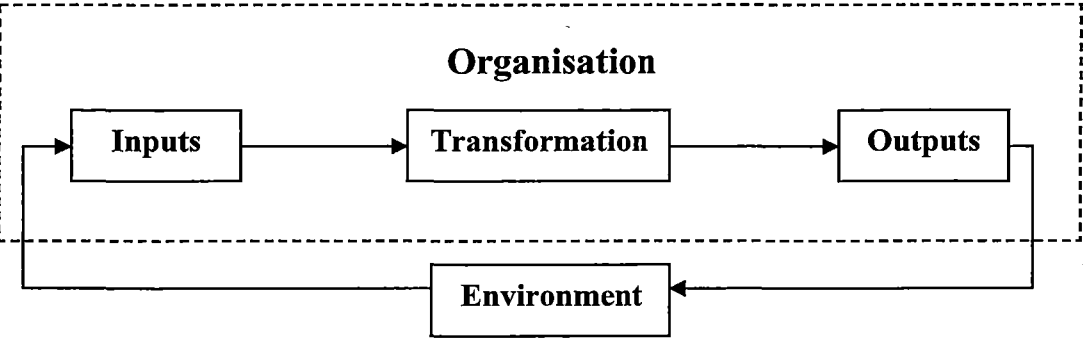
The operational hypothesis for this research is that there is a significant relationship between systems' OE criteria and organisational effectiveness in seaport organisations where OE can be assessed by a range of reliable and valid systems' OE variables. This relationship is reinforced by the impact of facilitating OE indicators that are common across all phases of a system (OE Attributes).

The above relationships are developed conceptually and outlined in Figures 6.1 and 6.2. These figures are developed from the general to specific. Figure 6.1 (a reproduction of Figure 5.1, Chapter 5) depicts a generic open systems view of organisations.

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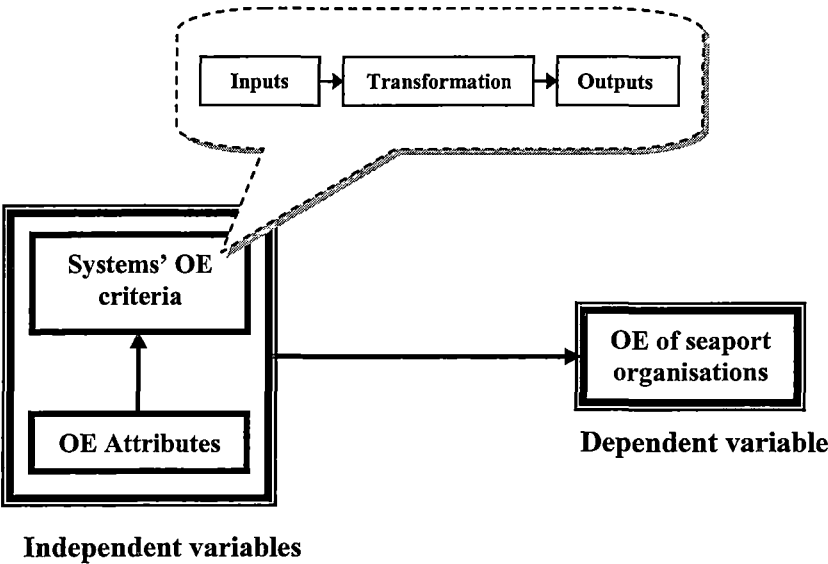
<sup>15</sup> This section mainly refers to the third hypothesis (H3).

Figure 6.1: Open System View of Organisations



The systems perspective broadly views the organisation as an open system interacting with its environment. This research does not aim to prove the relationships between the components of an open system (as shown above). Or more appropriately, these relationships do not need to be approved as they are widely accepted by all researchers and scholars of organisations and management. Therefore, the objective here is to test the relationship(s) between a systems’ OE criteria (mutually exclusive and independent variables) and overall effectiveness of seaport organisations (dependent variables). These relationships are shown in Figure 6.2.

Figure 6.2: Hypothesised direction of relationships



According to this view, as shown in Figure 6.2, different systems’ OE indicators (independent variables) independently affect organisational effectiveness (dependent

variables). The independent variables are, in turn, affected by OE attributes. This is to say that different components of a generic open system (inputs-transformations-outputs), with their own specific OE indicators, interact and are facilitated by OE attributes to affect organisational effectiveness.

## 2.2. Research Design

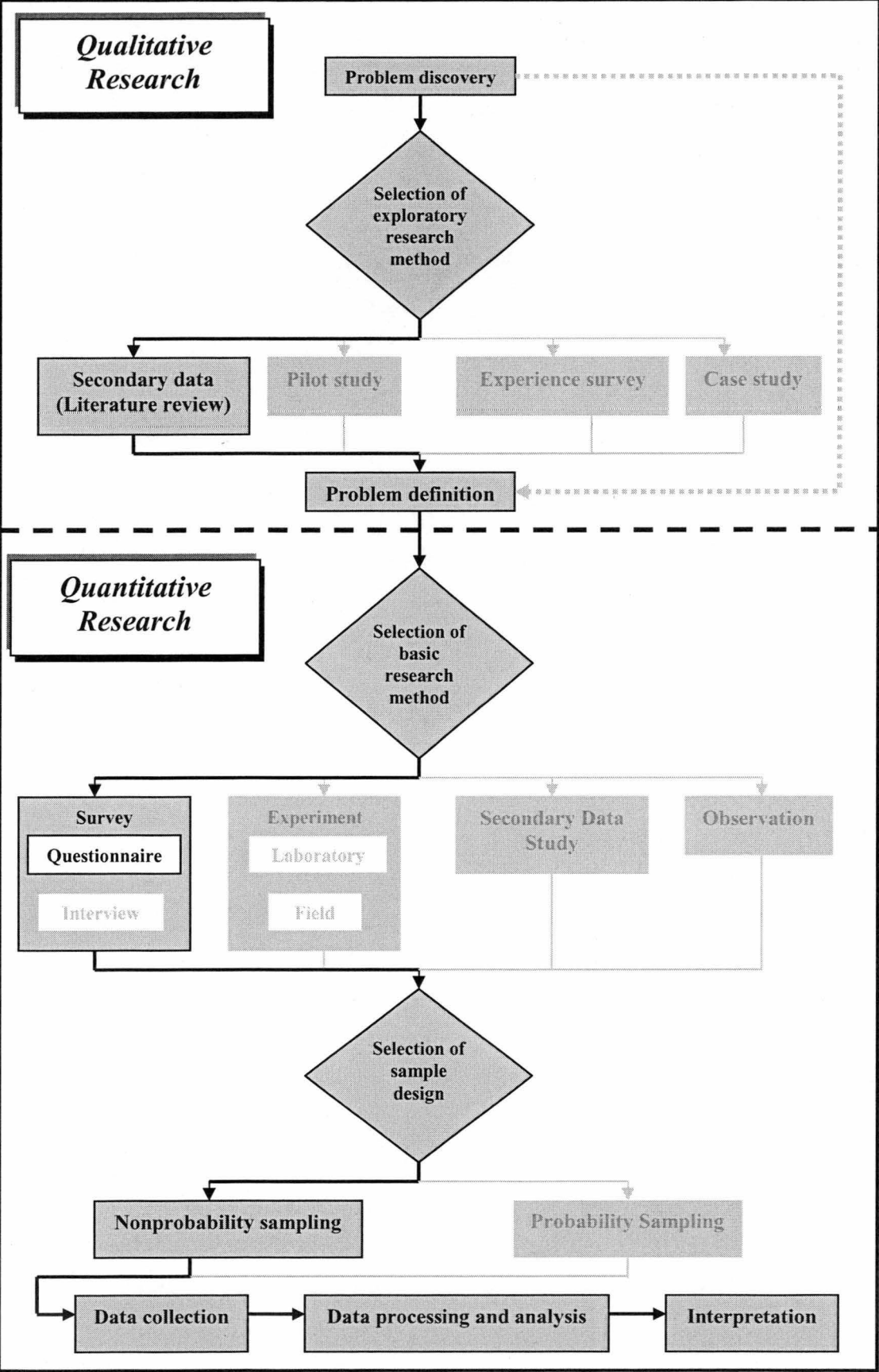
Ragin (1994, as quoted in Flick 2004, p. 146) refers to research design as a 'plan', and further contends:

Research design is a plan for collecting and analysing evidence that will make it possible for the investigator to answer whatever questions he or she has posed. The design of an investigation touches almost all aspects of the research, from the minute details of data collection to the selection of the techniques of data analysis.

For the purpose of clarity on what constitutes the research methodology and design, the direction of research and the methods used in this study, a flowchart or a plan has been developed. Figure 6.3 depicts the direction and process of this research. In this flowchart, the solid and bold lines are used to indicate the direction of the research and the methods utilised from the beginning to the end of this research. As shown in the flowchart, an overall exploratory approach survey is the most appropriate method of analysis for the first stage of this study, as suggested by many researchers (e.g. Kumar 1996; Davis 1996; Zikmund 2003; Neuman 2003; Yin 2003). Zikmund (2003, p. 111) clearly explains that 'exploratory research provides greater understanding of a concept or crystallises a problem...'.

To justify the research methods utilised in this research and to further explore them, the focus and purposes of the study needs to be specified first.

Figure 6.3: Flowchart of Research Process



Source: Created for this research based on Zikmund (2003)

### 2.2.1. Focus and Purposes of the Study

Based on the research questions and hypotheses, this study focuses on OE of service industry organisations in general, and seaport organisations in particular. Many different OE models that have been designed primarily for service organisations; or with general applicability (claimed to be applicable to all organisations); or for other industries than service organisation (partially claimed to be applicable to service organisations), are examined.

The purposes of this study are fourfold. First, this study aims to introduce the concept of Organisational Effectiveness (OE), to investigate the methods, and to identify the criteria used to assess OE in organisations. This includes the investigation of appropriate existing OE models that are widely reported, and identification of their indicators. Second, it aims to explore the findings in the context of seaport organisations and theorise a model of OE suitable for Iran's seaports organisation, which can be used to assess its effectiveness. Third, it aims to answer the research questions and test the hypotheses based on the first and second purposes. Fourth, this study suggests probable future trends for the development of the OE model and assessment of organisational effectiveness in seaport organisations.

Before describing the methods used to achieve these objectives, it is helpful to distinguish between *methodology* (assumptions or paradigms) as the philosophy or general principle behind research, and *methods* as the practice of research in terms of strategies and techniques (Hall & Hall 1996). This is to stress that in selecting certain research methods (i.e. qualitative, quantitative), we are consciously or unconsciously taking on board their methodological assumptions (i.e. positivist, interpretivist, critical) about the nature of the social world and the principles of social inquiry (Hall & Hall 1996). For completeness, these are elaborated in the following sections.

### 2.2.2. Research Methodology/Paradigm and Methods

In the organisational and social science literature, there are a number of different approaches relating to organisational inquiry. Each approach has its own set of



philosophical assumptions and principles and its own stance on how to do research (Neuman 2003). These assumptions might be called knowledge claims (Creswell 2003); paradigms (Kuhn 1970); philosophical bases (Cavana, Delahaye & Sekaran 2001); or broadly research methodologies (Hall & Hall 1996; Neuman 2003).

The approaches that attracted much comment in the literature and are appropriate for this research are those of Cavana et al. (2001) and Neuman (2003). These authors identified three approaches or paradigms for business and organisational research. Their approaches are positivist, interpretivist, and critical paradigms and it is claimed they can be incorporated with any type of research.

The positivist (also referred to functionalist) paradigm is based on careful observation, examination and measurement of the objective reality that exists in the world, so that we can better understand the laws and theories that govern the world (Creswell 2003). In practice, positivist researchers begin with a theory, collect data that either supports or refutes the theory, and then make necessary revisions before additional tests are conducted. Positivist research uses precise, rigour, objective and value free measures and is usually associated with quantitative data (Neuman 2003). Based on this paradigm, data collection follows rigorous steps through experiments or surveys and then the quantitative data are analysed using statistical methods (Cavana et al. 2001).

In contrast, the interpretivist (sometimes referred to constructivist) paradigm rests on the premise that (Creswell 2003, p. 8):

...individuals seek understanding of the world in which they live and work. They develop subjective meanings of their experiences—meanings directed toward certain objects or things. These meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas.

An interpretivist researcher tries to identify what is meaningful to each individual or subject being investigated and becomes fully involved with these individuals or subjects. According to Cavana et al. (2001, p. 9), this involvement ‘allows the researcher to uncover the socially constructed meaning as it is understood by an individual or a group of individuals’. Unlike positivist researchers who precisely measure selected quantitative details about thousands of subjects and use statistics,

interpretivist researchers may study/live with a subject to gather large quantities of detailed qualitative data to acquire an in-depth understanding of how they create meaning (Neuman 2003).

The final paradigm, critical, aims to empower people to create a better world for themselves (Cavana et al. 2001). Neuman (2003, p. 80) further elaborates on this paradigm and calls it a ‘...critical process of inquiry that goes beyond surface illusions to uncover the real structures in the material world in order to help people change conditions and build a better world for themselves’. In the critical paradigm (often referred to as pragmatic), instead of methods being important, the problem is most important, and researchers use all approaches to understand the problem and to use pluralistic approaches to derive knowledge about the research problem (Creswell 2003). In other words, critical researchers or pragmatists may use any research technique, but they tend to favour an historical-comparative method of research through qualitative data (Neuman 2003). Table 6.1 compares the three major paradigms of research.

The methodology adopted in this study integrates both Neuman’s (2003) positivist and critical paradigms, which incorporate quantitative and qualitative methods respectively. The first part of this study use the critical (qualitative—historical data analysis) paradigm, and the second part the positivist (quantitative—primary data analysis) paradigm. Therefore, to achieve the earlier mentioned objectives, a multiple method of qualitative and quantitative approaches is employed (Figure 6.3).

**Table 6.1: Comparison of the Three Major Paradigms of Research**

	<b>Positivist</b>	<b>Interpretivist</b>	<b>Critical</b>
<b>Assumptions</b>	Objective world which science can measure and mirror with privileged knowledge	Intersubjective world which science can represent with concepts; social construction of reality	Material world of structured contradictions and/or exploitation which can be objectively known only by removing tacit ideological biases
<b>Aim</b>	To discover universal laws that can be used to predict human activity	To uncover the socially constructed meaning of reality as understood by an individual or group	To uncover surface illusions so that people will be empowered to change their world
<b>Stance of researcher</b>	Stands aloof and apart from research subjects so that decisions can be made objectively	Becomes fully involved with research subjects to achieve a full understanding of subjects' world	Involved with research subjects so that surface illusions can be identified, but urges subjects to change their world
<b>Values</b>	Value free; their influence is denied	Values included and made explicit	Values included and made explicit
<b>Types of reasoning</b>	Deductive	Inductive	Deductive and/or inductive
<b>Research plan</b>	Rigorous, linear and rigid, based on research hypothesis	Flexible, and follows the information provided by the research subject	The imperative for change guides the actions of the researcher
<b>Research methods and type(s) of analysis</b>	Experiments; questionnaires; secondary data analysis; quantitatively coded; documents statistical analysis	Ethnography; participant observation; interviews; focus groups; conversational analysis; case studies	Field research; historical analysis; dialectical analysis (mainly qualitative)
<b>Goodness or quality of criteria</b>	Conventional benchmarks of 'rigour'; internal and external validity; reliability and objectivity	Trustworthiness and authenticity	Historical situatedness; erosion of ignorance and misapprehensions; action stimulus

Source: Adapted from Cavana et al. (2001, pp. 10-11)

Qualitative and quantitative approaches differ in many ways, have their strengths and weaknesses, and advantages and disadvantages, but they complement each other in that they incorporate the respective roles of discovery and confirmation (Kumar 1996; Neuman 2003). Furthermore, it is recommended by many researchers that there is a need to combine both qualitative and quantitative approaches in many studies, and that there is increasing recognition by most disciplines that both types of research are important for a good research study (Kumar 1996). Table 6.2 compares the characteristics of qualitative and quantitative methods.

Mixing qualitative (subjective) and quantitative (objective) styles of research and data is known as 'triangulation of methods' (Neuman 2003, p. 139). This can occur in two ways—either sequentially or simultaneously. Sequential triangulation uses the methods sequentially—first one then the other. In simultaneous triangulation, both methods are carried out at the same time in one study.

This study essentially utilised a sequential combination; qualitative followed by quantitative. The multimethod sequential exploratory strategy, adopted in this study, seeks to elaborate on and expands the findings of one method with another method. This involves beginning with a qualitative method for exploratory purposes and following up with a large sample so that the researcher can generalise results to a population (Creswell 2003). This view of qualitative followed by quantitative is emphasised by Bryman (1988, p. 94) who suggests:

Precisely because of its exploratory and unstructured approach, qualitative research is often depicted as useful as a means of throwing up hunches and hypotheses which can be tested more rigorously by quantitative research.

Morgan (1998, as quoted in Creswell 2003) also suggests that this design (qualitative followed by quantitative) is appropriate to use when testing elements of an emergent theory resulting from the qualitative phase and that it can also be used to generalise qualitative findings to different samples.

**Table 6.2: Comparison between Qualitative and Quantitative Research**

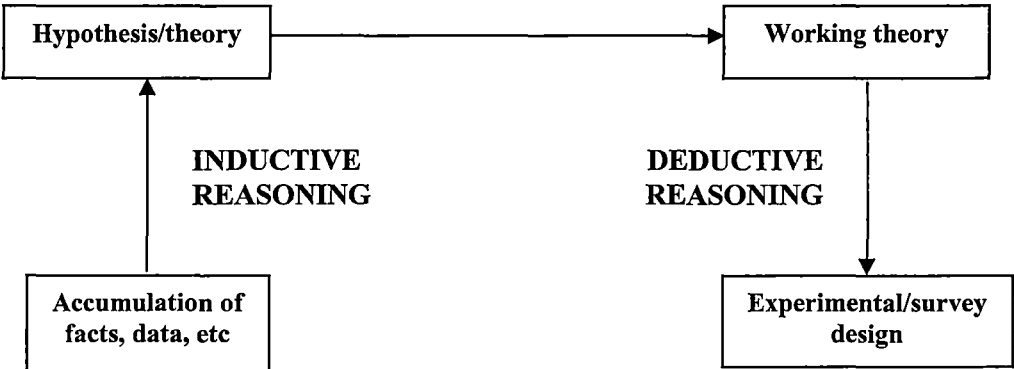
Qualitative Research	Quantitative Research
<ul style="list-style-type: none"> <li>• Reality is subjective and multiple</li> <li>• Research is value-laden and biased, with values generally made explicit</li> <li>• Capture and discover meaning once the researcher becomes immersed in the data</li> <li>• Concepts are in the form of themes, motifs, generalisations, and taxonomies</li> <li>• Measures are created in an ad hoc manner and are often specific to the individual setting or researcher</li> <li>• Data are in the form of words and images from documents, observations, and transcripts</li> <li>• Theory can be causal or non-causal, and is often inductive</li> <li>• Research procedures are particular, and replication is very rare</li> <li>• Analysis proceeds by extracting themes or generalisations from evidence and organising data to present a coherent, consistent picture</li> </ul>	<ul style="list-style-type: none"> <li>• Reality is objective and singular</li> <li>• Research is assumed to be value-free and unbiased</li> <li>• Test hypothesis that the researcher begins with</li> <li>• Concepts are in the form of distinct variables</li> <li>• Measures are systematically created before data collection and are standardised</li> <li>• Data are in the form of numbers from precise measurement</li> <li>• Theory is largely causal and is inductive</li> <li>• Procedures are standard, and replication is assumed</li> <li>• Analysis proceeds by using statistics, tables, or charts and discussing how what they show relates to hypotheses</li> </ul>

Source: Adapted from Cavana et al. (2001, p. 35); Neuman (2003, p. 145)

Indeed, based on the fundamental differences between qualitative and quantitative approaches, it is the combination of the two approaches that generates a synergistic energy, which provides unique and important insights (Cavana et al. 2001). The qualitative research is based on inductive reasoning while quantitative research is based on deductive reasoning.

The inductive process involves observation of certain phenomena and arriving at a certain conclusion—that is, moving from the particular to the more theoretical general (Davis 1996). Whereas, in the deduction process, the researcher begins with an abstract, theoretical proposition, and then moves towards concrete empirical evidence—that is, moving from the general to the particular (Gray 2004). In the case of this study, Figure 6.4 illustrates the direction of theorising and the pattern of combining the inductive (theory-building and hypotheses development) and deductive (hypotheses testing) processes.

**Figure 6.4: Combination of Inductive and Deductive Methods**



Source: Adapted from Gary (2004, p. 8)

In the present study, qualitative research facilitates quantitative research by acting as a precursor to the formulation of problem(s) and the development of an instrument for quantitative research. In other words, qualitative research works as a source of theories or hypotheses to be tested by quantitative research (Bryman 1988). Thus, the multiple paradigm method, as a strategy of inquiry, allowed the researcher to firstly (qualitatively) explore historical data, develop a theory, and hypothesise a model, and to secondly (quantitatively) test the hypotheses and answer the research questions. The logic underlying these approaches and the instruments utilised by these methods are discussed in detail in the following sections.

### 2.2.3. Qualitative Approach – Literature Review and Theory/Model-Building

As is the case with this current study, qualitative research often begins with vague or unclear research questions, and the core topic emerges slowly during the study (Neuman 2003). That is, qualitative research is emergent rather than being tightly prefigured (Creswell 2003). The exploratory research purpose, with a qualitative approach, is to gain a good knowledge of the situation; that is, organisation, people, facts, organisation environment and alike, as well as to discover and clarify the nature of the research problem (Davis 1996; Zikmund 2003). Zikmund (2003, p. 111) describes the qualitative approach, as a means of exploratory research, as:

Much, but certainly not all, exploratory research provides qualitative data...The focus of such qualitative research is not on numbers but on words and observations: stories, visual portrayals, meaningful characterisations, interpretations, and other expressive descriptions. Any source of information may be informationally investigated to clarify which qualities or characteristics are associated with an object, situation, or issue.

The essence of such an approach, which is more context oriented and uses verbatim sources in a heuristic way, is thus to seek qualitative data that give rich and in-depth information about the processes in specific settings to reduce the complexity of the empirical field of research and to unravel complex structures (Bendikat 1996; Neuman 2003). Flick, Kardorff and Steinke (2004, p. 3) also suggest that qualitative research:

...seeks to contribute to a better understanding of social realities and to draw attention to processes, meaning patterns and structural features...Qualitative research, with its precise and 'thick' descriptions, does not simply depict reality, nor does it practise exoticism for its own sake. It rather makes use of the unusual or the deviant and unexpected as a source of insight and a mirror whose reflection makes the unknown perceptible in the known, and the known perceptible in the unknown, thereby opening up further possibilities for (self-) recognition.

A more specific and detailed definition of the qualitative method is given by Denzin and Lincoln (1994, p. 2) who makes a clear distinction between this method and other approaches to research:

Qualitative research is multimethod in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials—case study,

personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts—that describe routine and problematic moments and meanings in people's lives.

Since research problems and issues were not precisely clear, and as the above types of research correlate well with the intentions of the current study, a qualitative exploratory approach including literature review was adopted. Literature review, as the main source of secondary data, not only helped to bring clarity to the research problem, improved research methodology, and broadened the knowledge base in the research area (knowledge building), but also contributed to formulating research questions, answering specific design queries, and served as a means of developing a theoretical and conceptual frameworks (theory building) (Kumar 1996; Merriam 1998). Zikmund's (2003) two general objectives of secondary data research—fact finding and model building, were the logic underlying the conduct of the literature review pertinent to the study. The comprehensive literature review adopted by this study is thus integrative in nature. This is mainly because, on one hand it summarises past research by drawing overall conclusions from many separate studies that are believed to address related or identical hypotheses, and on the other hand it presents the state of knowledge concerning the relation(s) of interest, highlights important issues that research has left unresolved, and intends to direct future research so that it yields a maximum amount of new information (Cooper 1989). That is, the core issues that emerged from the literature gradually built into significant sets of themes, or concerns that linked to, and helped to specify, the research questions and the research design for solving them (Gray 2004).

An important part of this research approach was the building of a model. The term 'model' basically refers to a dynamic framework or schema that helps portray the key concepts, propositions etc. of the research theory, which can be developed (conceptually or theoretically) at the start of a piece of research, and then tested through the process of data gathering, analysis, and reasoning; or they may be the end product of research (Bennett 1991). However, this research, with the aid of exploratory study and a qualitative approach, endeavoured to establish the nature of key variables potentially affecting the effectiveness of seaport organisations. Once these variables were correctly identified, the research method developed a theory or a model for the study.



Collectively, a comprehensive review of relevant literature was undertaken for this study as shown in Chapters 2, 3 and 4 which ultimately found the problem or gap (absence of OE model for port organisations), and theorised a model (Chapter 5) (see previous section on how the model is inductively derived). That is, the researcher did not bring a preconceived theory to the interpretation of collected information; rather, the theory/model was extracted out of the collected information itself (Thomas 2003).

#### **2.2.4. Quantitative Approach – Survey Research**

The necessary distinctions between qualitative and quantitative approaches and associated concepts have been previously discussed and will not be repeated here. As the research moves from an exploratory study to a hypothesis-testing study, it tended to move from a qualitative to a quantitative design (Cavana et al. 2001). While the first part of this study relies heavily upon qualitative research, quantitative data from surveys or other instruments can be used to support the findings of the qualitative data (Merriam 1998). Therefore, for a quantitatively oriented methodology, hypotheses were derived and formulated at the outset of this chapter based on the qualitative research to reveal the nature of certain relationships and to explain the correlation between independent and dependent variables (Cavana et al. 2001; Meinefeld 2004). Quantitative research attempts to study the current status of people and events in terms of amounts and frequencies (Thomas 2003). King, Keohane and Verba (1994, pp. 3-4) highlight these aspects of quantitative research and believe that:

Quantitative research uses numbers and statistical methods. It tends to be based on numerical measurements of specific aspects of phenomena; it abstracts from particular instances to seek general description [deduction] or to test causal [and correlational] hypotheses; it seeks measurements and analyses that are easily replicable by other researchers.

Based on the fact that almost all quantitative researchers rely on the positivist approach (Neuman 2003), a somewhat similar view on quantitative approach to research is expressed by Creswell (2003, p. 18):

A quantitative approach is one in which the investigator primarily uses positivist claims for developing knowledge (i.e., cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the test of theories), employs strategies of inquiry such as

experiments and surveys, and collects data on predetermined instruments that yield statistical data.

Quantitative research is primarily of two forms—experiment research and survey. Experiments, which can be conducted in laboratory or in real life, consist of treating objects (i.e. people) in a defined way (a contrived environment) and then evaluating the outcome to determine how the treatment influenced the objects and why the treatment had such an effect (Thomas 2003; Gray 2004). The purpose of experiments is to establish and study ‘cause and effect’ relationships between variables by manipulating the independent variables (Sekaran 2000). In the current study however, the establishment of cause and effect relationship between the variables is not possible, as it is not certain that the changes in one variable cause change in other variables and therefore variables cannot be manipulated.

On the other hand, in survey techniques, the researcher manipulates no situation or condition; he or she asks many people (a sample from larger population) numerous questions in a short period of time and people simply answer the questions, then the researcher summarises and analyses the answers and endeavours to generalise the results to a population from which the sample was chosen (Neuman 2003). Survey research is usually conducted to test a theory or hypothesis in the field through exploring the association and correlation between variables (Gray 2004). In addition, a survey provides a quantitative description of trends, attitudes, or opinions of a population about a subject by studying a sample of that population; then from sample results, the researcher generalises or makes claims about the population (Creswell 2003), as is the case in this study. That is, for the quantitative part, a survey was conducted (primary data) to assess and test the validity of the model.

A correlational method is appropriate for the quantitative aspect of this study as compared to a causal method of quantitative investigation<sup>16</sup>. That is, by conducting a survey for the current research, the researcher is interested in delineating correlation between variables that are associated with the research problem rather than the cause and effect relationships (Sekaran 2000). Furthermore, this study is correlational in that it is trying to determine whether or not a quantitative relationship exists between the

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<sup>16</sup> ‘When the researcher wants to delineate the *cause* of one or more problems, then the study is called a causal study. When the researcher is interested in delineating the important variables that are *associated* with the problem, it is called a correlational study’ (Cavana et al. 2001, p. 113).

identified variables (e.g. between identified criteria of OE and effectiveness of seaport organisations; regular OE assessment and organisation location, manager's ranks, and manager's education level; etc.) and if so, what is the degree of relatedness.

As far as a timeframe for this research is concerned, this study used a cross-sectional time horizon, which is attributable and compatible with the survey method. Unlike longitudinal studies which assess the change and development over time (in experimental research), the cross-sectional studies use a snapshot approach where the data are collected at a single point in time (Gray 2004).

The instrument utilised as a method of quantitative data collection (primary data) in this study was a questionnaire, of which its design, administration and process are discussed in-depth in later sections.

### **3. Research Method – Survey**

The general characteristics of survey methods have been briefly discussed. The objectives of this section and its subsections are to elaborate on the actual survey method(s) that was/were utilised in this study and to provide justification(s) for their utilisation in comparison with other methods.

Considering a broad classification of nonexperimental research methods, virtually all researchers agree that these methods can be divided into two types—observation studies and survey research. The distinction is based on how the variables of the study are measured. In this regard, Herzog (1996, p. 31) states:

In observation studies, the researcher obtains scores for participants by observing their ongoing behaviour and making judgements about it (so-called observational or behavioural measures). In survey research, participants make their own judgements and tell the researcher about their status with respect to the variables being studied (so-called self-report measures).

The survey is the most widely used data gathering technique. Survey is specifically defined by Zikmund (2003, p. 175) as 'a research technique in which information is gathered from a sample of people by use of a questionnaire or interview; a method of

[primary] data collection based on communication with a representative sample of individuals’.

As previously explained and the above discussion also confirms, a survey research approach is adopted for this study to maximise the benefits of the combined qualitative and quantitative approaches. Survey research can be further subdivided into interviews and questionnaires based on how the survey is going to be administered. This section introduces the development of the survey instrument, method of pre-testing, conduct of the survey, response rate, and techniques used in survey data analysis.

### 3.1. Questionnaire Survey

Questionnaires are one of the most frequently used methods for gathering data from individuals in research studies (Bourque & Fielder 1995). ‘A questionnaire is a preformulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives’ (Sekaran 2000, p. 233). In other words, the questionnaire is a technique of data collection in which each person is asked to respond to the same set of questions in a predetermined order (Saunders, Lewis & Thornhill 2003).

Although other survey methods, like interviewing, have the advantage of flexibility in terms of adapting and adopting, and changing the questions as the researcher proceeds with the interviews, questionnaires have the advantage of obtaining data more efficiently in terms of time, energy, and costs (Sekaran 2000). In addition, when the potential respondents are scattered over a wide geographical area (as in this study), there is no choice but to use a questionnaire, as face-to-face interviewing in these circumstances would be extremely expensive (Bourque & Fielder 1995; Kumar 1996). Above all, questionnaires are often preferred to interviews in quantitative studies, as they involve quantification and are an ideal means of providing quantified information (Ticehurst & Veal 1999). The questionnaire (paper-and-pencil) method of data collection has several disadvantages too. Some of the disadvantages of a self-administered questionnaire along with its advantages are listed in Table 6.3.

**Table 6.3: Advantages and Disadvantages of Self-Administered Questionnaires**

<b>Advantages</b>	<b>Less cost</b>	It is cheaper compared to other methods
	<b>Larger samples</b>	It allows for wider geographic coverage, thus larger sample of persons or groups
	<b>Implementation</b>	It is much easier to implement than other kinds of surveys
	<b>Less time</b>	It is relatively quicker compared to other methods
	<b>Timing</b>	All respondents receive the questionnaire almost simultaneously
	<b>Sensitive topics</b>	It is an efficient means of gathering information on sensitive issues
<b>Disadvantages</b>	<b>Greater anonymity</b>	It offers anonymity and avoids researcher bias
	<b>Low response rate</b>	Since respondents do not always complete and return questionnaires, the biggest problem with questionnaires is a low response rate
	<b>Limited application</b>	Questionnaire application is limited to those that can read and write. It cannot be applied to illiterate, very young, very old, or handicapped
	<b>Lack of opportunity to clarify</b>	If respondents do not understand or misinterpret some questions, there is no opportunity for them to have the meaning clarified
	<b>Incomplete and/or frivolous responses</b>	Due to absence of researcher, the risk of returning incomplete questionnaires and frivolous responses is high

Source: Adapted from Frankfort-Nachmias & Nachmias (1992); Oppenheim (1992); Bourque & Fielder (1995); Kumar (1996); Ticehurst & Veal (1999); and Neuman (2003).

The design of a questionnaire differs according to how it is going to be administered, and in particular the amount of contact the researcher has with the respondents (Saunders et al. 2003). The administration of questionnaires can broadly be classified under two main categories, best described as the ends of a ‘unidimensional continuum’ (Bourque & Fielder 1995). At one end is ‘supervised administration’ where respondents complete the questionnaires in the presence of the surveyor. At the opposite end of the

continuum is 'unsupervised administration' that questionnaires are completed by the respondents not in the presence of the surveyor.

Mail and online questionnaires are the most common example of unsupervised administration. Mail questionnaires are usually posted to potential respondents who return them by post after completion. Online questionnaires are delivered and returned electronically using either email or the Internet (Saunders et al. 2003). However, the most popular and effective method of supervised administration is group or collective administration (Oppenheim 1992). This method presents the best way of administering a questionnaire to obtain a captive audience such as in a classroom, workplace, people attending a function, participants of a program, people assembled in one place or other group settings (Kumar 1996). Particularly, when the survey is confined to one organisation, and the organisation is willing and able to assemble groups of employees to respond to the questionnaires at the work place, personally administering questionnaires in groups is a good way to collect data (Sekaran 2000). Among numerous advantages of group administration, the followings can be highlighted (Oppenheim 1992; Bourque & Fielder 1995; Kumar 1996; Page & Meyer 2000; and Sekaran 2000):

- The researcher has the opportunity to introduce the research topic, objectives of the survey, and motivate respondents to participate;
- The researcher has more flexibility in terms of clarification, as the explanations given about the meaning or intent of the items and prompts will be exactly the same for all respondents (consistent instructions);
- Any questions that the respondents might have regarding the questionnaire could be answered on the spot (surveyor can give help to respondents where needed in a nondirective way);
- The researcher can show respondents a variety of visual aids/stimulus (i.e. transparencies, PowerPoint slides, etc.);
- Administering questionnaires to a large numbers of individuals simultaneously is less expensive and less time-consuming than other survey methods (i.e. interviewing);
- It is the quickest way of collecting data as the researcher can collect all the completed questionnaires within a short period of time;

- This method ensures a very high response rate compared to mail and online administration.

Because of these exceptional characteristics, it is recommended that wherever possible, it is advantageous to administer questionnaires personally to groups of respondents (Sekaran 2000). Therefore, group administration was found to be very appropriate for this research study for two additional and supplementary reasons. First, in order to gain the maximum benefit from advantages, and to minimise the disadvantages of self-administered questionnaires (listed in Table 6.3), this method was adopted. Second, since the researcher is familiar with the culture of research in Iran, it was realised that, by conducting mail or online questionnaires, either the rate of response would be very low or no valuable data could be collected.

It is usually recommended by scholars to adopt standard questionnaire batteries—that is, adopting sets of questions already developed and widely used (Bourque & Fielder 1995). This is because firstly, the questionnaire has already been tested and there is no need of pre-testing; secondly, instructions have already been developed and tested; third, using the questionnaire utilised in other studies allows the data collected to be compared to the data collected in those prior studies or to a standard population. But the literature review for this research (OE assessment) showed that such a questionnaire does not exist in the area of Organisational Effectiveness (OE). In fact, most of the previous empirical studies in the domain of OE have either proposed a model of OE and then attempted to measure/assess OE of a particular organisation using their unconfirmed proposed model through a survey instrument (questionnaires or interviews), or developed a list of OE criteria and then conducted a survey (questionnaires or interviews) by asking respondents to rate the most important criteria for measuring OE—that is, the OE model was the end result of such survey. Whereas the current study has taken a different approach by theorising a system-based OE model through qualitative research and endeavours to empirically test the validity of criteria used in the model by utilisation of a group-questionnaire survey. Therefore due to the absence of a standard and pre-tested instrument for the purpose of this research, the questionnaire needs to be specifically designed. The stages of its development are discussed in the following section.

### 3.2. Questionnaire Development

Development of a survey instrument is one of the most time-consuming steps in the survey research process and its structure depends on the procedure that is going to be used to administer it (Graziano & Raulin 2000). A well-planned and carefully constructed questionnaire will increase the response rate of the study and also will greatly facilitate the summarisation and analysis of the collected data (Berdie & Anderson 1974). Further, the validity and reliability of the collected data depend, to a large extent, on the design of questions, the structure of the questionnaire, and the rigour of pre-testing (Saunders et al. 2003).

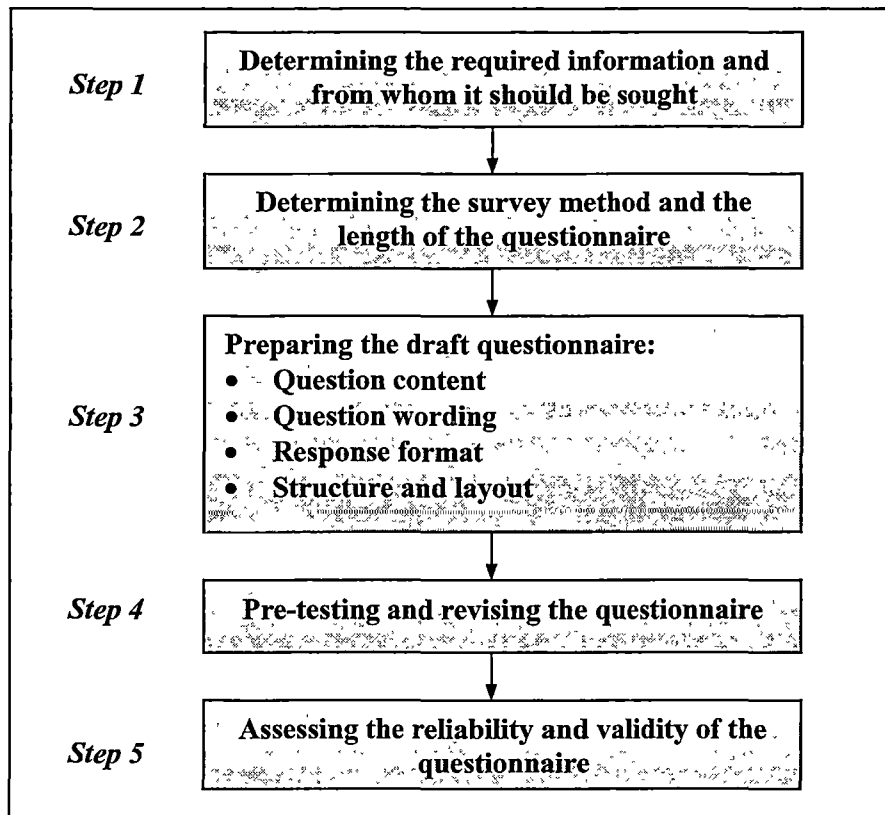
According to Cavana et al. (2001, p. 227), sound questionnaire development principles should focus on the following three areas:

The first relates to the wording of the questions. The second refers to planning issues—how the variables will be categorised, scaled and coded after receipt of the responses. The third pertains to the general appearance of the questionnaire. All three are important factors in questionnaire design because they can minimise biases in research.

The literature covers a wide range of activities required in designing, development and construction of a questionnaire to fulfil the above requirements; however, Frazer and Lawley (2000) are typical in their five-step model which was used for the purposes of this study (Figure 6.5).



Figure 6.5: Questionnaire Design Process



Source: Adapted from Frazer and Lawley (2000, p. 19)

These five general steps of questionnaire development will now be explained in greater detail.

### 3.2.1. Step 1: Determining the required information and from whom it should be sought

The starting point should be an examination of objectives, theoretical questions or hypotheses to be addressed, followed by the drawing up of a list of information to address the problems (Ticehurst & Veal 1999).

To be able to identify the information needed for questionnaire development, the objectives of the research that have been refined into research questions and hypotheses were referred to frequently (deductive approach; see section 2.2.2. and Figure 6.4). The main purposes of this research were to understand the beliefs, perceptions, opinions and attitudes of respondents about the exact criteria for measuring OE in seaport

organisations, and overall impacts of OE assessment in seaport organisations (e.g. on operational performance of seaports, etc.).

Therefore, to achieve these purposes and to meet the two basic criteria of questionnaire development—relevancy and accuracy (Zikmund 2003), efforts were made to focus the questionnaire design around the required information by repeatedly linking back every included question to the research questions.

The second part of this step deals with the potential respondents. The respondents could be from any seaport organisation across the world. The objectives of the research made it clear that the theoretical model is designed to be tested in Iran's Port and Shipping Organisation (PSO), thus PSO managers of different locations, ranks, and educational levels were found to be appropriate respondents for the purpose of this survey. The details of the targeted population and sample selection will be discussed in the sample design section.

### **3.2.2. Step 2: Determining the survey method and length of the questionnaire**

The choice of mail, online (e-mail or Internet) or group administered questionnaires will affect the questionnaire design. The details of these methods have been explored in preceding sections (see section 3.1) and justifications for selecting a group administered questionnaire as an appropriate data collection instrument for this research study were presented.

The length of the questionnaires is another important issue in questionnaire development. In this respect, Saunders et al. (2003, p. 304) state:

There is a widespread view that longer questionnaires should be avoided as this reduces response rates. However, it has been difficult to separate the effect that questionnaire length has on response rates from other factors such as topic, type of respondents and the way in which it is administered.

Conversely, a very short questionnaire may also suggest that research is insignificant and hence not worth bothering with (Saunders et al. 2003). Therefore, it is suggested

that questionnaires should be no longer than 12 pages; in general, most questionnaires range between 4 and 12 pages (Bourque & Fielder 1995).

While keeping these guidelines for the length of the questionnaire in mind, the following factors were also used in questionnaire development for the current research:

- Including only those questions relevant to the purpose of the study (research questions and hypotheses);
- Limiting the questionnaires to absolutely essential items;
- Including items of interest to the respondents;
- Considering the maximum amount of time a respondent would be willing or able to spend answering questions;
- Not crowding items together on the questionnaire. That is, leaving sufficient space between questions, between each question and the set of response categories, and between the alternative response categories to help the respondents move through the questionnaire.

These factors led to the development of a 10-page questionnaire (only questions, excluding covering letter and model description) with a total number of 51, mostly close-ended, questions (Appendix 3).

### **3.2.3. Step 3: Preparing the draft questionnaire**

Four features are to be considered in turn when preparing a draft questionnaire: question content, question wording, the desired format for responses, and the structure and layout of the questionnaire (Frazer & Lawley 2000).

The question content must be specific to the objectives of the study. It should reflect the information required in step 1—by reviewing the research objectives (research questions, hypotheses, variables) and focusing on what needs to be addressed. Research questions may be concerned with facts, opinions, perceptions, attitudes, respondent's motivation, and their level of familiarity with a certain subject (Frankfort-Nachmias & Nachmias 1992). As far as question content is concerned, most questions, however, are classified as either factual questions—seeking objective information from respondents

regarding their background, environment, habits, and the like; or non-factual questions—seeking subjective information regarding respondents' beliefs, attitudes, feelings, and opinions (Oppenheim 1992).

Both types of questions were included in the current research questionnaire (Appendix 3). Non-factual (or subjective) questions were included to understand the respondents' beliefs, feelings, attitudes, and opinions about research questions and variables (sections A and B of the questionnaire). Factual (or objective) questions were also asked mainly to provide information by which respondents could be classified to aid in explaining differences in their behaviours and attitudes (section C of the questionnaire).

The choice of language and wording is critical in questionnaire design. The language of the questionnaire should approximate to the level of understanding of the respondents. The choice of words depends on their educational level and the usage of terms and idioms in their culture (Cavana et al. 2001). In addition, effective wording can make the questions easy to understand and as unbiased as possible (Porter & Coggin 1995). Therefore, although the respondents to the current study questionnaire were supposed to be well educated (BSc. holders and above), every attempt was made to use purposeful, concrete, short length, and simple (by using conventional language) questions so that participants would not have any difficulty to answer them (Fink 1995). This is not to say that the designed questionnaire was a perfect instrument, but as the survey was conducted through group (or collective) administration, possible imperfections were rectified and unclear questions, raised by respondents during the course of administration, were explained and clarified in the field by the surveyor.

The response formats used in the questionnaire were dominantly close-ended questions with ordered choices (multi-dichotomous). However, some scaled-response questions (likert scale), a few partially close-ended, and two close-ended with unordered response choices were also included (Salant & Dillman 1994). Open-ended questions were avoided as much as possible due to time constraints or except where very short answers were required. The choice of using close-ended was mainly to (Foddy 1993; Sekaran 2000):

- help the respondents to make quick decisions to choose among several alternatives before them;
- allow all respondents to answer the same question so that answers can be meaningfully compared;
- produce less variable answers;
- present a recognition, as opposed to a recall, task to respondents and for this reason respondents find them much easier to answer; and
- produce answers that are much easier to computerise, and thus helping the easy coding of the information for subsequent analysis.

The order of response formats used in the questionnaire is as follows (Appendix 3):

- Close-ended questions with ordered choices (multi-dichotomous):
  - Section A, Part 1, questions 1-8
  - Section A, Part 2, questions 1-4
  - Section A, Part 3, questions 1-10
  - Section A, Part 4, questions 1-6
  - Section C, questions 7 and 8
- Close-ended with scale-response questions (likert scale):
  - Section B, questions 1-11
- Partially close-ended questions:
  - Section A, Part 1, question 9
  - Section A, Part 2, question 5
  - Section A, Part 3, question 11
  - Section A, Part 4, question 7
- Close-ended with unordered response choices:
  - Section C, questions 1 and 2
- Open-ended questions that required very short answer:
  - Section C, questions 3-6.

The order or sequence of questions can affect the motivation of respondents to complete the questionnaire. In general, questions should be sequenced to minimise the discomfort and confusion of respondents (Neuman 2003). Structuring the order of questions so that

they are logical will also help to ensure the respondent's cooperation and eliminate indecision (Zikmund 2003).

Layout and physical attractiveness are other crucial points in designing a questionnaire. A questionnaire must be laid out and printed in such a way that the person who needs to read it can follow all the instructions easily and answer all the questions that are meant to be answered (Ticehurst & Veal 1999). In this regard, Sekaran (2000, p. 244) also states that 'an attractive and neat questionnaire with appropriate introduction, instruction, and well-arrayed set of questions and response alternatives will make it easier for the respondents to answer them'.

As can be seen in Appendix 3, the questionnaire began with the proposed model of OE, its description, and a brief definition of OE, followed by three main distinctive question sections (Sections A, B, and C) and four subsections in section A (Parts 1, 2, 3, and 4). Each section and subsection was individually titled and subtitled followed by a clear instruction on how to answer the questions.

A cover letter printed on AMC letterhead accompanied the questionnaire (Appendix 2). This letter contained introductory remarks to the questionnaire and explained the purpose of the survey. It also tried to establish some rapport with the respondents and motivate them to respond to the questionnaire willingly and enthusiastically (Cavana et al. 2001). In addition, the following were incorporated in the covering letter (Singleton & Straits 1999):

- it identified the researcher, the survey sponsor and the researcher's contact details;
- it showed how the finding may benefit port organisations;
- it explained how the sample was drawn and the importance of each respondent's cooperation to the study;
- it assured individuals that they will not be identified and the information provided will be held in strict confidence;
- it stated that the respondents' participation is entirely voluntary and they can withdraw at any time without prejudice;
- it explained that the questionnaire will take only few minutes (10-20 minutes) to fill out;

- it promised to send respondents a summary of the study's findings (as an incentive); and
- finally, it explicated the legitimacy of conducting the survey by explaining that the project has received approval from the Human Research Ethics Committee (Tasmania) Network.

As mentioned earlier, the questionnaire in this research was in three sections. Section A consisted of four parts focusing on the four phases of the theorised system-based model in sequence—namely input, transformation, output, and attributes (H3, hypothesis 3). Section B looked at hypotheses 1 and 2 (H1 and H2), while Section C aimed to collect some background and personal information from respondents. The reason for placing the personal information section at the end was that of Sekaran (2000, p. 241) who states ‘...by the time the respondent reaches the end of the questionnaire the individual would have been convinced of the genuineness of the questions posed by the researcher, and hence be more open to sharing personal information’. Zikmund (2003) also agrees with the above statement and believes that asking personal information, such as education, at the beginning may embarrass or threaten respondents.

Finally, with each questionnaire, a definition sheet including definition of all criteria used in the OE model was given to respondents to help them answer the questions in Section A (Appendix 4).

#### **3.2.4. Step 4: Pre-testing and revising the questionnaire**

The first draft of a questionnaire is never perfect and ready to administer; therefore prior to using the questionnaire to collect data it must be pre-tested (Bourque & Fielder 1995). According to Oppenheim (1992, p. 47):

Questionnaires do not emerge fully-fledged; they have to be created or adopted, fashioned and developed to maturity after many abortive test flights. In fact, every aspect of a survey has to be tried out beforehand to make sure that it works as intended.

The purpose of pre-testing is to refine the survey instrument so that respondents will have no problems in answering the questions and there will be no problem in collecting

the data (Saunders et al. 2003). In addition, the result of pre-testing can estimate the questionnaire completion time (Ticehurst & Veal 1999).

The detail of pre-testing carried out for the current research instrument is explained in a later section.

### **3.2.5. Step 5: Assessing the reliability and validity of the questionnaire**

The final and important issue in constructing a survey instrument is whether the instrument accurately and consistently measures what it is supposed to measure (Frazer & Lawley 2000). In other words, the survey instrument should be both valid and reliable.

Reliability refers to ‘the degree to which measures are free from error and therefore yield consistent results’, and validity is ‘the ability of a scale or measuring instrument to measure what it is intended to measure’ (Zikmund 2003, pp. 300 & 302). Although perfect reliability and validity are impossible to achieve (Neuman 2003), efforts were made to address these issues during the previous four steps of the questionnaire design process. These were particularly emphasised by adapting strategies like conducting an in-depth literature review before drafting the questionnaire, using feedback from pre-testing to refine questions, and using precise measurement scales wherever possible.

Furthermore, the validity and reliability of each item of the survey instrument was thoroughly tested through appropriate statistical techniques, details of which are presented in the next two chapters.

## **3.3. Translation of the Questionnaire**

In cross-cultural research, adept translation of a survey questionnaire is an integral part of the questionnaire development process. This requires being conceptually and technically equivalent to the source language, culturally competent, and linguistically appropriate for the target population (May 1993). Conceptual equivalence refers to the absence of differences in meaning and content between two versions of an instrument,



while technical equivalence refers to equivalence in grammar and syntax (Brislin, Lonner & Thorndike 1973).

Most researchers agree that it is no longer acceptable to use a direct-translation technique (or one-way-translation) for translating survey instruments (e.g. Saunders et al. 2003; Zikmund 2003; Cavana et al. 2001; Sekaran 2000). A review of the literature indicates that the most accepted approach to translation is one in which different techniques are used to ensure the reliability and validity of the translated instrument (Brislin et al. 1973). The rationale behind this approach is that no single technique adequately demonstrates and improves the equivalence of an instrument. Hence, it is always recommended that the process of translating a survey instrument should include forward-translation and back-translation (Zikmund 2003).

In the case of the current research, the questionnaire has to be translated from English to Persian. Therefore, the finalised English version (after pre-testing completion of the English version) was translated into Persian by the researcher, who is a native speaker of the target language and with personal experience in Iran. Although many discrepancies were detected and rectified during pre-testing of the Persian version, the finalised translated version (after pre-testing completion of the Persian version) was sent to a bilingual independent translator, whose native tongue was Persian, to translate it back into the original language (Sekaran 2000). Once this process was complete, a final review of the original English version, the translated version, and the back-translated version was conducted by the researcher to identify any inconsistencies in terms of technical and conceptual equivalence. This revision and consequent necessary modifications made it possible to produce an appropriate Persian questionnaire which maintained integrity and equivalency with the English version.

The finalised Persian version of the cover letter, the questionnaire, and OE criteria definition tables are shown in Appendices 5, 6, and 7 respectively.

### **3.4. Questionnaire Pre-testing**

The purpose of pre-testing has already been discussed (see Section 3.2.4.). The current research instrument has undergone three phases of pre-testing prior to its actual

administration. First, the draft of the English version of the questionnaire was pre-tested by five highly educated native academics (university lecturers and researchers) who were familiar with survey and research phenomena. Their function was to determine whether the questionnaire would be able to accomplish the survey objectives. Some constructive feedbacks and comments were received from the respondents and alterations were made accordingly.

The second phase of pre-testing involved the draft of the Persian version, which was sent to five Iranian native persons with bilinguistic ability, two of whom had MSc degree from an English speaking country in maritime related courses and had previously worked in Iran's PSO and were familiar with research surveys. The other three were potential respondents from PSO. Valuable information and comments received from these respondents convinced the researcher to change some aspects of the questionnaire.

Although the result of the second pre-testing indicated that the questionnaire was almost ready for actual administration, the advice of Frazer and Lawley (2000, p. 34) was taken. They state 'don't just pre-test once—keep pre-testing until you are satisfied that no more changes are required to improve the questionnaire'. Thus, the third phase also took place. In this phase of pre-testing, the modified Persian questionnaire was administered to five different people with almost the same diversity as the second phase, in terms of qualification and occupation. The comments from this pre-test were very useful in shaping the final Persian version of the questionnaire.

In all three phases of pre-testing, respondents were asked to complete the questionnaire and give suggestions on (Bell 1999, as quoted in Saunders et al. 2003):

- how long the questionnaire took to complete;
- the clarity of instructions;
- which, if any, questions were unclear or ambiguous;
- which, if any, questions the respondents felt uneasy about answering;
- whether in their opinion there were any major topic omissions;
- whether the layout was clear and attractive;

- the acceptability and comprehension of translation (only in the second and third phases); and
- any other comments to improve the questionnaire.

It is worth noting that pre-testing should use the same communication method and administrative procedures as intended in the study (Bourque & Fielder 1995), however group administration of pre-testing was not feasible for the current study due to cost and time constraints. Therefore, the pre-testing questionnaire was sent to each respondent electronically (as an email attachment, PDF format) while explaining the method of administration to be employed for the survey.

### 3.5. Sampling

Sampling is ‘the process of selecting a sufficient number of elements from the population so that by studying the sample, and understanding the properties or the characteristics of the sample subjects, it would be possible to generalise the properties or characteristics to the population elements’ (Sekaran 2000, p. 266).

In the current research, a nonprobability sampling design was adopted. That is, the surveyor selected the sample because he believed it was typical and was composed of especially informative cases (Salant & Dillman 1994). The selected sample comprised all top managers, middle managers, department heads, and first line managers (supervisors), holding a BSc or higher degree, of Iran’s PSO in headquarters and its six branches in six major seaports.

The decision to base the sample on positions and qualifications of respondents was to ensure the validity of collected data. First of all, PSO managers and decision makers, at any level or rank, were supposed to have an in-depth knowledge and insight about the ongoing organisational activities (e.g. processes, procedures, goals, visions, missions, plans, organisational structure, etc.) and desired future of their organisation. Second, it was thought that when skill, experience, managerial responsibility, and strategic role are supplemented with an academic degree, it would yield even more organisational insight in providing important information about organisational effectiveness. The decision was also designed to increase the rate of response, as the PSO’s decision makers are more

enthusiastic to participate in research activities, particularly surveys, about their own organisation.

The complete list of PSO managers of all levels, in headquarters and the six major ports to whom the survey was intended to reach, was initially estimated to include a survey population of 250 persons. In reality, however, the survey questionnaire was administered in the field to only 225 respondents (noting respondents' leave, travel, etc.). This represented a significant sample size for the current survey (90 per cent of total population). The breakdown of the number of respondents in each location is illustrated in Table 6.4.

**Table 6.4: Number of Respondents from Each Location**

	H.Q	B. Abbas	B.I.K	Bushehr	Chabahar	Anzali	Noshahr	Total
No. of respondents	40	50	45	20	25	28	17	225
Percentage of Sample	17.8	22.2	20.0	8.9	11.1	12.4	7.5	100.0

### 3.6. Conduct of the Survey—Administering the Questionnaire

As previously discussed, this study utilised a group administration questionnaire technique to collect the primary data. Compared to a mail questionnaire, a group or collective administration incurs higher administrative costs and travel expenses (Salant & Dillman 1994), but the benefits of achieving a very high response rate, and having personal contact with the respondents to explain the purpose, relevance and importance of the study and clarifying any questions that respondents may have, outweigh the expenses (Kumar 1996). Furthermore, this technique allows for delivery and collection of questionnaires within a short period of time and eliminates the need for subsequent follow-ups (Saunders et al. 2003).

After finalising the English and Persian versions of the questionnaire, the conduct of the survey involved a number of procedures, which are elaborated below.

### 3.6.1. Procedure 1

The actual field administration of the questionnaire was conducted from early December 2004 to mid January 2005. But before that the finalised English version of the survey questionnaire and the covering letter were submitted to and approved by the Human Research Ethics Committee (Tasmania) Network on 15 November 2004.

### 3.6.2. Procedure 2

Prior to administration, the researcher sent an electronic copy of the questionnaire to the Research Centre of PSO (RCPSO) and contacted them to inform them about the intention of carrying out a survey in the organisation's headquarters and six major seaports. Subsequently, the RCPSO agreed and promised verbally to cooperate with the researcher, and later issued an official consent letter<sup>17</sup>, signed and sealed by the General Director of RCPSO, for conducting such a survey.

### 3.6.3. Procedure 3

The researcher travelled from Australia to Iran and held a meeting with the RCPSO authority in headquarters (in Tehran) who welcomed the survey and suggested that:

- because of the infeasibility of gathering all headquarters managers of different levels in a meeting, and in order to allow more time for managers to complete the questionnaires (due to congestion of day-to-day work), a person to be appointed from the RCPSO and to be briefed by the researcher to administer and collect the questionnaires in the headquarters while the researcher travels to the other six locations (that are geographically dispersed) for administration and collection; and
- an official letter signed by the General Director of RCPSO to be faxed to the General Directorate of each seaport (Bandar Abbas, B.I.K, Bushehr, Chabahar, Anzali, and Noshahr) briefly explaining the intention of the survey, informing them

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<sup>17</sup> The original copy of this letter was submitted to the Human Research Ethics Committee (Tasmania) Network.

about the arrival date of the researcher, and inviting them to participate in the survey and cooperate with the researcher.

### **3.6.4. Procedure 4**

Each seaport was visited following a pre-planned schedule for administering the survey questionnaires. A meeting was arranged with all potential respondents in each seaport where the researcher could explain the topic of the study face-to-face, and hand out the questionnaire (appendix 6) with a covering letter (appendix 5) and an OE criteria definition sheet (appendix 7) to each respondent. Necessary instructions on how to complete the questionnaires were given, potential questions were answered, and ambiguities were clarified during the meetings. Wherever possible, the researcher used visual aids, such as overhead projector and video projector, to brief the respondents. Then, respondents, who were willing to participate, were given three choices to suit their convenience, for completing the questionnaires:

1. either complete the questionnaires at the meeting and return them; or
2. complete them by a specified time so that the researcher can collect them from their offices; or
3. complete them by a specified date and send them to RCPSO in headquarters.

For those respondents who selected the first or second method of returning, the researcher was able to check the completeness of questionnaires. By the time the administration and data collection in seaports was finished, the data gathering in headquarters was also successfully completed. These were handed over to the researcher along with some questionnaires from seaports, which were completed and sent directly to RCPSO.

## **3.7. Response Rate**

Low response has long been considered the major problem of questionnaire surveys (Dillman 2002); this is particularly eminent in developing countries. In this regard, Casely and Lury (1981, p. 1) believe that ‘the especial difficulties of conducting surveys in developing countries derive from their socio-economic structure. These countries are

in a period of rapid transition—demographically, economically, and culturally’. However, this research adopted a group administration technique with the intention of minimising this drawback and maximising the rate of response. Further strategies such as offering an incentive (i.e. sending a summary of finding), and attaching a letter of support from the General Director of RCPSO to each questionnaire, were also utilised.

Overall, this study successfully obtained a response rate of 80.0 per cent (or 180 usable questionnaires) from managers of Iran’s PSO (in headquarters and six major ports), which is very high for a questionnaire survey. The details of response rate are shown in Table 6.5.

**Table 6.5: Overall Response Rate of PSO Managers**

	No. of respondents	Response Rate (%) at Each Location	Overall Percentage
Headquarters	40 (%17.8)	21 (%52.5)	%9.3
Bandar Abbas	50 (%22.2)	43 (%86)	%19.1
B.I.K	45 (%20)	36 (%80)	%16
Bushehr	20 (%8.9)	16 (%80)	%7.1
Chabahar	25 (%11.1)	25 (%100)	%11.1
Anzali	28 (%12.4)	22 (%78.6)	%9.8
Noshahr	17 (%7.5)	17 (%100)	%7.6
Total	225 (%100.0)	180	%80.0

Interestingly, the lowest rate of response (52.5 per cent) belongs to headquarters where an RCPSO representative conducted the survey and collected the completed questionnaires and not the researcher.

**3.8. Data Analysis**

One way to make sense out of the data accumulated from survey research, such as the responses to a questionnaire, is to analyse the findings statistically (Porter & Coggin 1995). Prior to and sometimes during the analysis stage, several interrelated procedures

(i.e. editing, coding, and data entry or keyboarding) are performed to summarise and rearrange the raw data (Zikmund 2003).

Therefore, in order to prepare the data for analysis, the accumulated raw data were thoroughly scanned for editing. The purpose of editing was to ensure that the data on the questionnaires were complete, error-free, readable, consistent with other information, and arranged to facilitate coding and tabulation before transferring to a computer for analysis (Singleton & Straits 1999).

Coding refers to systematically reorganising raw data into a format that is machine-readable (i.e. easy to analyse using computers) (Neuman 2003). In other words, 'coding is the allocation of numeric or alphabetical symbols to edited data which allows computer analysis' (Benjamin & Moore 2002, p. 55). The allocation of codes for the survey instrument of this research was undertaken before storing the data into a computer (i.e. as an input device).

Finally, coded responses were analysed using the Statistical Package for the Social Science (SPSS) version 12 for Windows. The full details of editing, coding, and analysing are discussed in the next chapter.

## 4. Summary

This chapter revolved around methodological techniques and design issues for addressing the research questions and hypotheses. Based on the focus and purpose of the study, a sequential triangulation of methods—qualitative followed by quantitative, was adopted. This method allowed the researcher firstly to qualitatively explore historical data, develop a theory, and hypothesise a model, and secondly to quantitatively test the hypotheses and answer the research questions.

The qualitative approach was utilised to establish the nature of key variables potentially affecting the effectiveness of seaport organisations, and once these variables were correctly identified, the research method developed a theory or a model for the study. Whereas a quantitative approach is to be used to support the findings of the qualitative data.



A questionnaire survey was found to be an appropriate instrument for collecting primary data for this research. The full details of questionnaire development, method of pre-testing, conduct of the survey, response rate, and techniques used in survey data analysis were presented.

The next two chapters will present and analyse the data relating to the research questions and hypotheses that were collected through the questionnaire survey.

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## **Chapter 7**

### **Result of the Survey—Research Questions 1 and 2**

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#### **1. Introduction**

The objectives of this chapter and the next chapter (Chapter 8) are to report the results of the survey of OE of Iran's PSO and to present the analysis of the collected data with respect to research questions and hypotheses. Based on the similarity in the nature of the data and consequently the statistical techniques used, this chapter will analyse and discuss the survey data as related to the first and second research questions, while the next chapter will concentrate on the third research question. However, as the primary statistical assumptions, pre-analysis data preparation, and respondents' general information are the same for all three research questions, they will only be discussed in this chapter and will not be repeated in the following chapter. Therefore, in this chapter, the primary statistical assumptions will first be detailed followed by a discussion on the methods of data preparation and the presentation of respondents' demographic information. Secondly, appropriate statistical techniques are used to achieve three objectives: getting a feel for the data (descriptive statistics), testing the goodness of data (i.e. Cronbach's alpha and principal component factor analysis as measures of reliability and validity), and testing the first and second hypotheses (i.e. appropriate statistical manipulation including bivariate, correlation techniques, etc.), thus answering the related questions developed for this research (Sekaran 2000).

Prior to statistical analysis, three assumptions had to be made. Firstly, it should be noted that there are a number of different reliability coefficients for determining the internal reliability or consistency of a set of items that are designed to measure a particular characteristic/element (Cramer 1998). One of the most commonly used is Cronbach's

alpha ( $\alpha$ ), which is based on the average correlation of items within a test if the items are standardised (Coakes & Steed 2001). Alpha typically varies between 0 and 1. The closer the alpha is to 1, the greater the internal reliability and consistency of items in the instrument being assessed. However, as there is no set interpretation as to what is an acceptable alpha value, a rule of thumb that applies to most situations is (George & Mallery 2005; Cavana, et al. 2001):

- $\alpha > 0.9$ —excellent
- $\alpha > 0.8$ —good
- $\alpha > 0.7$ —acceptable
- $\alpha > 0.6$ —questionable but acceptable
- $\alpha > 0.5$ —poor
- $\alpha < 0.5$ —unacceptable

Thus, an alpha of 0.6 was set as the minimum acceptable level of internal reliability for the scales of this research.

Secondly, as far as validity of the data is concerned, factorial validity of the survey items was established by submitting the data to factor analysis to ensure that the items measured the same underlying dimension or dimensions (Field 2004). This analysis involved the following major steps (Comrey & Lee 1992):

- selecting the variables that were assumed to measure the same underlying concept;
- computing the matrix of correlations among the variables;
- extracting the unrotated factors (to get loadings of variables on factors);
- rotating the factors (orthogonal rotation) (to get loadings of variables on factors);
- and
- interpreting the rotated factor matrix (deciding to retain or eliminate the variables with rather low factor loadings—uncorrelated variables).

In research studies, it is usual to regard factor loadings (correlations of the variables with the factors) as high if they are greater than 0.6 and moderately high if they are above 0.3 (Kline 1994). However, in this current research, only factor loadings of above 0.5 were considered significant and important. It is worth noting that, prior to factor analysis, the data were transformed into suitable formats wherever the assumptions and

practical considerations underlying the application of factor analysis were violated (Coakes & Steed 2001).

Thirdly, the significance level ( $\alpha$ ) should also be set in advance of hypotheses testing. Therefore, a significance level of 5 per cent ( $\alpha = 0.05$ ), which is the most common significance level for business and management research (Cavana et al. 2001), was set for this study. That is, a significance level of 5 per cent ( $\alpha = 0.05$ ) indicates that the confidence level is 95 per cent.

## 2. Pre-analysis Data Preparation

Upon completion of data collection and prior to statistical data analysis, three tasks were accomplished to convert the raw data into computer format codes and numbers (data preparation). First, the completed questionnaires were thoroughly checked and edited simultaneously. This process was carried out by:

- searching for instances where respondents had annotated comment(s) to a question;
- scanning for missing responses;
- reviewing for inapplicable narrative answers;
- grouping the responses to open ended questions;
- checking for errors (e.g. where two responses were in direct conflict with each other); and
- looking for inconsistencies (e.g. where the answer to one question seemed to be inconsistent with another)

Second, even though the questionnaire response categories were pre-coded before administration, due to the involvement of a large number of variables in the research (i.e. 60) a codebook was prepared.

The aim of the codebook (Appendix 8) was to detail the computer entry column(s) for each variable, the range of permissible values for each variable, the response pattern, and the codes denoted to responses (Page & Meyer 2000). At this stage, the inapplicable and missing responses were coded '88' and '99' (or '8' and '9' where applicable) respectively, and deleted from further analysis (Zikmund 2003).

Thirdly, the data from questionnaires were transcribed into coding sheets (raw data matrix). This method allowed convenient data handling and entry into a computer instead of flipping through each questionnaire for each item (Cavana et al. 2001). These data sheets are illustrated in Appendix 9.

Finally, data were transferred from coding sheets to computer—the software utilised to perform data analysis was SPSS 12.0 for Windows.

### **3. Respondents' General Information**

The intention of this section is not to contemplate and present a detailed statistical analysis of the respondents' demographics and/or to prove any potential relationship between respondents' variables and other variables. Rather, the aim is to concisely identify the main characteristics of the sample respondents that may help understanding attributes of the survey population.

As can be seen in Table 7.1, out of two hundred and twenty five eligible respondents, one hundred and eighty managers representing PSO's headquarters and six major branches responded to the survey. Of these managers, 21 (11.7%) were from headquarters, 43 (23.9%) from Bandar Abbas, 36 (20%) from Bandar Imam Khomeini, 16 (8.9%) from Bushehr, 22 (12.2%) from Anzali, 17 (9.4%) from Noshahr, and 25 (13.9%) from Chabahar.

Table 7.1: Respondents' General Information

Variables	Number of Respondents	Percentage %	Valid Percentage %	Cumulative Percentage %
<b>Location</b>				
- H.Q.	21	11.7	11.7	11.7
- B. Abbas	43	23.9	23.9	35.6
- B.I.K.	36	20.0	20.0	55.6
- Bushehr	16	8.9	8.9	64.4
- Anzali	22	12.2	12.2	76.7
- Noshahr	17	9.4	9.4	86.1
- Chabahar	25	13.9	13.9	100.0
- Total	180	100.0	100.0	
<b>Education</b>				
- Master	55	30.6	30.6	30.6
- Bachelor	125	69.4	69.4	100.0
- Total	180	100.0	100.0	
<b>Position</b>				
- Dept. Head	28	15.6	23.3	23.3
- Line manager	46	25.6	38.3	61.7
- Middle Manager	33	18.3	27.5	89.2
- Top Manager	13	7.2	10.8	100.0
- No Response	60	33.3	100.0	
- Total	180	100.0		
<b>Years in Current Position</b>				
- 1-5	86	47.8	68.8	68.8
- 6-10	29	16.1	23.2	92.0
- 11-15	10	5.6	8.0	100.0
- No Response	55	30.6	100.0	
- Total	180	100.0		
<b>Years in PSO</b>				
- 1-5	34	18.9	18.9	18.9
- 6-10	62	34.4	34.4	53.3
- 11-15	51	28.3	28.3	81.7
- 16-20	18	10.0	10.0	91.7
- 21-25	2	1.1	1.1	92.8
- Above 25	13	7.2	7.2	100.0
- Total	180	100.0	100.0	
<b>Years in Current Branch</b>				
- 1-5	53	29.4	29.4	29.4
- 6-10	64	35.6	35.6	65.0
- 11-15	42	23.3	23.3	88.3
- 16-20	11	6.1	6.1	94.4
- 21-25	5	2.8	2.8	97.2
- Above 25	5	2.8	2.8	100.0
- Total	180	100.0	100.0	

As far as qualifications of the respondents is concerned, 125 (69.4%) of them possessed Bachelor degree, while 55 (30.6%) have Master degree (Table 7.1). Table 7.2 tabulates the breakdown of respondents' qualifications in each location, with their corresponding percentages.

Table 7.2: Respondents’ Organisation Branch and Qualification Cross-tabulation

		PSO Branch							Total
		H.Q.	B.Abbas	B.LK.	Bushehr	Anzali	Noshahr	Chabahar	
Qualification	MSc. %	15 71	12 28	7 19	7 44	2 9	6 35	6 24	55
	BSc. %	6 29	31 72	29 81	9 56	20 91	11 65	19 76	125
Total		21	43	36	16	22	17	25	180

Of the 180 participants, only 120 declared their position titles and 125 stated the number of years they have been in their current position (Table 7.1). A cross-tabulation of these variables reveals a total number of 119 (66.1%) valid cases (i.e. respondents who have completed both questions). A comparison of the respondents’ position title and the period of holding current position shows a reasonable participation of PSO managers at different ranks across the organisation (Table 7.3).

Table 7.3: Comparison of Respondents’ Current Occupation and the Number of Years

			Position Title				Total
			1 <sup>st</sup> Line Manager	Dept. Head	Middle Manager	Top Manager	
Years in Current Position	1-5	No. %	17 14.3	35 29.4	22 18.5	8 6.7	82 68.9
	6-10	No. %	8 6.7	6 5.0	10 8.4	3 2.5	27 22.7
	11-15	No. %	3 2.5	4 3.4	1 0.8	2 1.7	10 8.4
Total			No. % 28 23.5	45 37.8	33 27.7	13 10.9	119 100.0

Since this survey strived to focus on managers of PSO to gain from their knowledge, experience and insight, it is wise to explore the distribution of PSO managers of different ranks, who contributed to this survey, across the organisation (7 locations). Of the 120 managers who proclaimed their position titles, 13 (10.8%) were top managers, 33 (27.5%) middle managers, 46 (38.3%) department heads, and 28 (23.3%) 1<sup>st</sup> line managers. The spread of these managers in headquarters and 6 major seaport branches is shown in Table 7.4.

**Table 7.4: Distribution of PSO Managers in Different Locations**

			Position Title				Total
			1 <sup>st</sup> Line Manager	Dept. Head	Middle Manager	Top Manager	
PSO Branches	H.Q.	No. %	3 2.5	7 5.8	4 3.3	2 1.7	16 13.3
	B. Abbas	No. %	7 5.8	11 9.2	5 4.2	2 1.7	25 20.8
	B.I.K.	No. %	7 5.8	11 9.2	8 6.7	0 0.0	26 21.7
	Bushehr	No. %	2 1.7	4 3.3	4 3.3	2 1.7	12 10
	Anzali	No. %	4 3.3	5 4.2	3 2.5	2 1.7	14 11.7
	Noshahr	No. %	1 0.8	4 3.3	5 4.2	2 1.7	12 10
	Chabahar	No. %	4 3.3	4 3.3	4 3.3	3 2.5	15 12.5
Total		No. %	28 23.3	46 38.3	33 27.5	13 10.8	120 100.0

#### 4. Reasons for Regular Assessment of OE in Port Organisations

This section deals with the first research question and hypothesis and discusses the related results obtained from the survey as related to question 1 and hypothesis 1:

**Q1.** Why should the effectiveness of a seaport organisation be assessed/measured regularly? What is the relationship between this assessment and organisation location, managers' ranks and managers' education levels?

**H1.** The result of regular assessment of OE can be used to improve seaport organisation's effectiveness, regardless of its location, managers' ranks and managers' education levels.

Different variables associated with regular assessment of OE in seaport organisations were self-assessed by respondents using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'. All results, analyses and tables using these variables were constructed from answers to questions in the survey instrument.



Items in the survey instrument related to this question and hypothesis will be statistically examined in three ways. Firstly, Cronbach's alpha and principal component factor analysis will be discussed to test the reliability and validity of collected data. Secondly, descriptive statistics will be used to get a feel for the data. Thirdly, appropriate statistical techniques will be conducted to test the hypotheses.

The scales of 6 variables of Regular OE Assessment in seaport organisations were analysed for inter-item consistency reliability (Cronbach's alpha reliability coefficient). The result indicated that the corrected item-total correlations were highly correlated in all 6 items, and the Cronbach's alpha ( $\alpha$ ) for the 6-item Regular OE Assessment was at an acceptable level of slightly above 0.73, and the factor loadings were all above 0.5 (Table 7.5) indicating that all items measured what they were intended to measure.

Inspection of 'Corrected Item-Total Correlation' and 'Alpha if Item Deleted' columns in Table 7.5 showed that elimination of any of these items would not increase the alpha level higher than 0.73. Therefore all items were included for further statistical analyses. Factor scores were also calculated for each of the Regular OE Assessment items. These assessments provided adequate support for the validity and reliability of the Regular OE Assessment items of the survey instrument.

**Table 7.5: Internal Consistency Analysis (Cronbach's alpha reliability coefficient) for Regular OE Assessment Items**

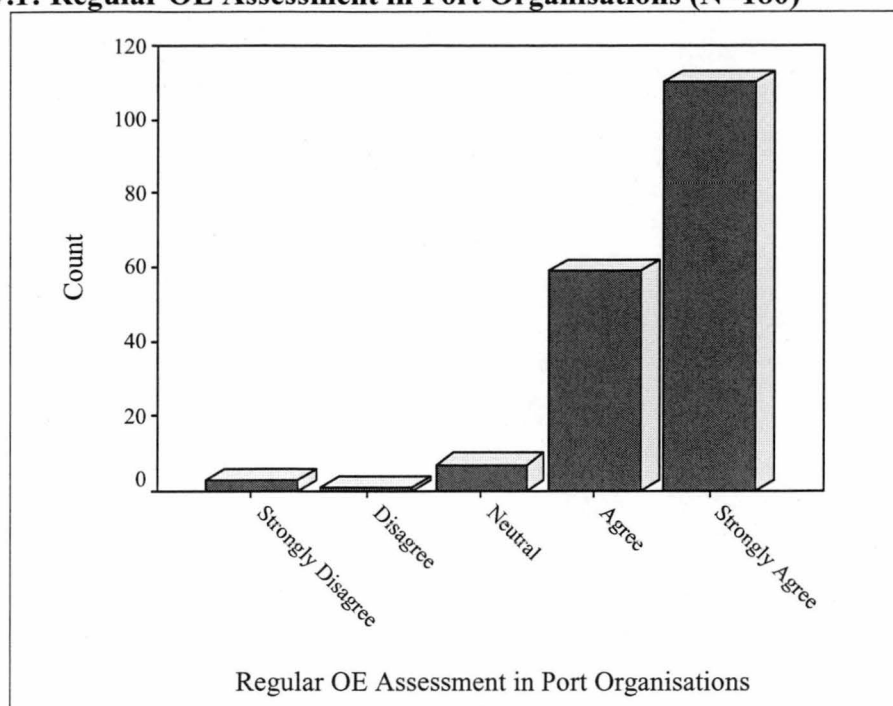
	Corrected Item-Total Correlation	Alpha if Item Deleted	Factor Loadings	N of Cases	Alpha Score
Regular Assessment of OE	.4065	.7103	0.600	180	0.7315
Regular Assessment of OE by System-based Model	.4157	.7109	0.599		
Result of Regular Assessment of OE to Indicate Effectiveness Status of Port Organisation	.4243	.7057	0.604		
Result of Regular Assessment of OE to Enhance Effectiveness of a Port Organisation	.5248	.6772	0.712		
Result of Regular Assessment of OE to Guide for Future Strategic Planning	.4528	.6979	0.647		
Result of Regular Assessment of OE to Indicate Port Organisation Weaknesses	.5792	.6582	0.754		

With respect to statistical analysis, first each item/variable was individually tested using statistical techniques suitable for single samples, such as one-sample Chi-square and Kolmogorov-Smirnov one-sample tests, to ensure the existence or lack of significant differences between the frequencies of response categories of each item. Second, each variable was assessed by organisation location, managerial position titles, and managerial education levels variables using a series of nonparametric statistical tests, such as Chi-square test of relatedness/independence, Kruskal-Wallis several independent samples test, and Mann-Whitney and Kolmogorov-Smirnov two-independent-samples tests. These tests were carried out to reveal whether the significant differences, which were found in frequencies of responses to each item (first sets of statistical tests), were related to any particular branch, position title, or education level (hypothesis of independence tests). Third, finally the first variable (Regular OE assessment) was used as a pivot variable and checked with the other five resultant variables for possible correlation using Spearman's rho bivariate correlation (Spearman's rank order correlation—a nonparametric alternative to Pearson's  $r$ ) (Healey 1999).

#### **4.1. Regular Assessment of OE in Port Organisations**

The item regular assessment of OE in port organisations was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.1) shows a skewed distribution with a mean of 4.51 (out of 5). Both the median and mode were 5 (strongly agree level).

**Figure 7.1: Regular OE Assessment in Port Organisations (N=180)**

As can be seen from Figure 7.1 and Table 7.6, the proposal for 'Regular Assessment of OE in Port organisation' was rated by a total of 110 managers (61.1%) and 59 managers (32.8%) as 'Strongly Agree' and 'Agree' respectively (approximately 94%).

The one-sample Chi-square test and the Kolmogorov-Smirnov one-sample test revealed significant differences between various responses to this item. The Chi-square value of 254.444 was significant at .000 ( $p < 0.05$ ), with 4 degrees of freedom. The Kolmogorov-Smirnov test also showed that the differences were significant at .000 ( $p < 0.05$ ).

**Table 7.6: PSO Managers' Responses to Regular OE Assessment in Port Organisations**

		Frequency	Percent (%)
Regular Assessment of OE in Port Organisations	Strongly Agree	110	61.1
	Agree	59	32.8
	Neutral	7	3.9
	Disagree	1	0.6
	Strongly Disagree	3	1.7
Total		180	100.0

When the responses to 'Regular Assessment of OE in Port Organisations' item was assessed by organisation branches (Table 7.7), 100 per cent of Noshahr managers (9.4 per cent of the total), 96 per cent of Chabahar managers (13.9 per cent of the total), 95.4 per cent of Anzali managers (12.2 of the total), 95.3 per cent of B. Abbas managers (23.9 per cent of the total), 95.2 per cent of H.Q. managers (11.7 per cent of the total), 87.6 per cent of Bushehr managers (8.9 per cent of the total), and 86.9 per cent of B.I.K. managers (20 per cent of the total) either agreed or strongly agreed to the proposal that port organisations should assess and measure their effectiveness regularly.

A Kruskal-Wallis test did not reveal any significant differences between different categories of the regular assessment variable in the various PSO branches (Chi-square value of 6.176 with 6 degrees of freedom, significant at .404, [ $p>0.05$ ]), nor did a Chi-square test (suitable for ordinal data although a little less sensitive). Even when PSO branches were aggregated into North and South branches, Mann-Whitney and Kolmogorov-Smirnov tests also failed to reveal significant differences between different categories of regular assessment in the various PSO branches (significant at .123 and .666 respectively [ $p>0.05$ ]).

**Table 7.7: Overall Regular OE Assessment Responses by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Regular Assessment of OE in Port Organisations	SA	No.	15	25	20	9	14	14	13	110
		%**	71.4	58.1	55.6	56.3	63.6	82.4	52.0	61.1
		%***	8.3	13.9	11.1	5.0	7.8	7.8	7.2	61.1
	A	No.	5	16	12	5	7	3	11	59
		%	23.8	37.2	31.3	31.3	31.8	17.6	44.0	32.8
		%	2.8	8.9	6.7	2.8	3.9	1.7	6.1	32.8
	N	No.	1		4	1	1			7
		%	4.8	0	11.1	6.3	4.5	0	0	3.9
		%	0.6		2.2	0.6	0.6			3.9
	D	No.				1				1
		%	0	0	0	6.3	0	0	0	0.6
		%				0.6				0.6
	SD	No.		2					1	3
		%	0	4.7	0	0	0	0	4.0	1.7
		%		1.1					0.6	1.7
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*0%=Within Branch

\*\*\*0%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

In relation to the managers' position titles aspect of the survey, of the 120 managers of different ranks who declared their position titles, 100 percent of top managers (10.8 percent of the total), 95.6 per cent of department heads (38.3 percent of the total), 94.1 per cent of middle managers (27.5 per cent of the total), and 85.7 per cent of first line managers (23.3 per cent of the total) agreed or strongly agreed with regular assessment and measurement of OE in port organisations, as can be seen from table 7.8.

A Kruskal-Wallis (one-way ANOVA, nonparametric) test did not find significant differences between different categories of the regular assessment variable and various position titles of managers (Chi-square value of 5.967, with 3 degrees of freedom, significant at .113), nor did a Chi-square test. Even aggregation and collapse of different managers' titles into Junior and Senior managers did not make Mann-Whitney and Kolmogorov-Smirnov tests to find significant differences between collapsed categories of regular assessment variable and the managers' position titles (significant at .283 and .967 respectively [ $p>0.05$ ]).

**Table 7.8: Overall Regular OE Assessment Responses by Managers' Position Titles (Managers [N=120], Titles [N=40])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Regular Assessment of OE in Port Organisations	SA	No.	18	25	19	12	74
		%**	64.3	54.3	57.7	92.3	61.7
		%***	15.0	20.8	15.8	10.0	61.7
	A	No.	6	19	12	1	38
		%	21.4	41.3	36.4	7.7	31.7
		%	5.0	15.8	10.0	0.8	31.7
	N	No.	3	1	1	0	5
		%	10.7	2.2	3.0	0	4.2
		%	2.5	0.8	0.8		4.2
	D	No.	1				1
		%	3.6	0	0	0	0.8
		%	0.8				0.8
	SD	No.		1	1		2
		%	0	2.2	3.0	0	1.7
		%		0.8	0.8		1.7
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*0%=Within Position Title

\*\*\*0%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Comparing responses to the 'Regular Assessment of OE in Port organisation' variable with the levels of managers' education (Table 7.9) revealed that 94.6 per cent of managers possessing Master degree (30.6 per cent of the total) and 93.6 per cent of managers with Bachelor degree (69.4 of the total) either agreed or strongly agreed to the proposition of regular assessment of OE in port organisations.

A Chi-square test did not reveal significant differences between regular assessment variable and managers' education levels. Mann-Whitney and Kolmogorov-Smirnov two-sample tests also failed to reveal significant differences between the regular OE assessment variable and managers' education levels (significant at .433 and .998 respectively [ $p>0.05$ ]).

**Table 7.9: Overall Regular OE Assessment Responses by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Regular Assessment of OE in Port Organisations	SA	No.	36	74	110
		%*	65.5	59.2	61.1
		%**	20.0	41.1	61.1
	A	No.	16	43	59
		%	29.1	34.4	32.8
		%	8.9	23.9	32.8
	N	No.	2	5	7
		%	3.6	4.0	3.9
		%	1.1	2.8	3.9
	D	No.	1	0	1
		%	1.8	0	0.6
		%	0.6	0	0.6
	SD	No.	0	3	3
		%	0	2.4	1.7
		%	0	1.7	1.7
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the results of regular OE assessment were evaluated by the result of OE periodical assessment (Table 7.10), 70.2 per cent of managers of different locations, positions, and qualifications believed that annual assessment of OE should be carried out in port organisations.

Chi-square, Kruskal-Wallis, Mann-Whitney, and Kolmogorov-Smirnov tests all revealed significant differences between the OE assessment variable and periodical assessment of OE variable. The chi-square test value of 62.219 was significant at .000 but more than 20 per cent of the cells had an expected count of less than 5 making the chi-square figure suspect. The Kruskal-Wallis test showed that significant differences existed between the two variables, differences that were significant at the .004 level ( $p < 0.05$ ) (Chi-square value of 13.402, with 3 degrees of freedom). Mann-Whitney, and Kolmogorov-Smirnov tests also showed significant differences between the two variables at the .002 and .047 respectively ( $p < 0.05$ ).

**Table 7.10: Overall Regular OE Assessment Responses by Periodical OE Assessment**

		Periodical Assessment of OE				Total
		Biannually	Annually	Biennially	Every 5 Years	
Regular Assessment of OE in Port Organisations (Total)	No. %	21 11.8	125 70.2	26 14.6	6 3.4	178 100.0

**4.1.1. Summary**

This section examined PSO managers’ responses to ‘Regular OE Assessment in Port organisation’ item. The variable was self assessed and measured using a 5-point Likert scale from ‘Strongly Disagree’ to ‘Strongly Agree’.

There were significant statistical differences between the frequencies of response categories towards the issue of regular assessment of OE in port organisations. The results showed that the PSO managers were largely in favour of this issue.

Although not statistically significant when regular OE assessment was evaluated by organisation location, this section found that the issue of regular OE assessment was independent of the organisation location. In other words, the majority of PSO managers, regardless of their organisation branch and size, had the same strong support for regular implementation of OE assessment in their organisation.

There were no statistical significant differences between regular OE assessment and PSO managers’ position titles. That is, the proposal of regular OE assessment was not related to any particular position in the organisation and treated the same by managers of different ranks. However, this section revealed that all PSO top managers, who responded to the survey, were more supportive of the issue, which could be an indication of their positive perception of the importance and usefulness of OE for their organisations.

Although there was not any statistical significant differences between regular OE assessment and managers’ education levels (i.e. regular assessment of OE was



independent of education), the analysis in this section found that the managers with Master degree stood slightly higher than those with Bachelor degree in supporting the regular OE assessment.

There was however significant statistical difference between overall OE assessment responses when assessed by periodical assessment of OE responses. The difference was predominantly between annual assessment of OE and all other periodical categories (biannual, biennial, and every 5 years) with managers of all ranks, locations, and educations rating the annual assessment of OE very high.

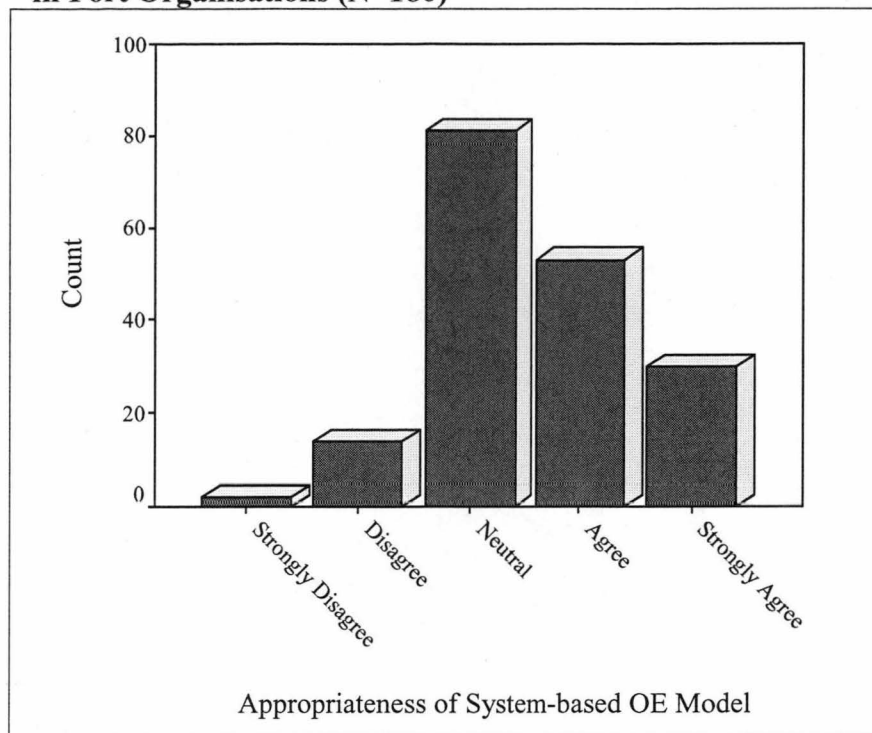
The next section will examine the appropriateness of a system-based model for regular assessment of OE in seaport organisations.

## **4.2. Appropriateness of a System-based Model for Regular Assessment of OE in Port Organisations**

The item appropriateness of a system-based model for assessing OE in port organisations was measured using a 5-point Likert scale ranging from ‘Strongly Disagree’ to ‘Strongly Agree’. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.2) illustrates an approximately normal distribution with a mean of 3.53 (out of 5). The median and mode both were 3 (out of 5).

**Figure 7.2: Appropriateness of System-based Model for Regular Assessment of OE in Port Organisations (N=180)**



As can be noted from Figure 7.2 and Table 7.11, although 46.1 per cent of PSO managers believed that a system-based model was an appropriate tool for regular assessment of OE in port organisations, but almost same percentage of managers (45.0 per cent) were undecided on the issue. This difference in managers' attitude was also emphasised by the one-sample Chi-square test and the Kolmogorov-Smirnov one-sample test that revealed significant differences existed between frequencies of responses to this item. The Chi-square value of 110.833 was significant at .000 ( $p < 0.05$ ), with 4 degrees of freedom. The Kolmogorov-Smirnov test also showed that the differences were significant at .000 ( $p < 0.05$ ).

**Table 7.11: PSO Managers' Responses to Appropriateness of A System-based Model for Regular Assessment of OE in port Organisations**

		Frequency	Percent (%)	Mean
Appropriateness of A System-based OE Model	Strongly Agree	30	16.7	3.53
	Agree	53	29.4	
	Neutral	81	45.0	
	Disagree	14	7.8	
	Strongly Disagree	2	1.1	
Total		180	100.0	

When appropriateness of a system-based model item was evaluated by organisation location (Table 7.12), the results showed that more than half of managers in B. Abbas (55.8 per cent), about half managers in Bushehr, Anzali, and Chabahar (50.0, 50.0, and 48.0 per cent respectively), and about one-third of managers in H.Q., B.I.K., and Noshahr (33.3, 36.1, and 35.5 per cent respectively) were undecided about appropriateness of a system-based model of OE.

Interestingly, a Chi-square test of relatedness and a Kruskal-Wallis test revealed the existence of significant differences between different system-based OE model response categories in the various PSO branches. The Chi-square value of 39.554 was significant at .024 ( $p < 0.05$ ), but more than 20 per cent of the cells had an expected count of less than 5 making the chi-square figure suspect. The Kruskal-Wallis test showed that marginal significant differences existed between the two variables, differences that were significant at .052 ( $p \leq 0.05$ ) (Chi-square value of 12.482, with 6 degrees of freedom).

**Table 7.12: Overall Appropriateness of A System-based OE Model Responses by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Appropriateness of A System- based OE Model	SA	No.	3	4	12	2	4	2	3	30
		%**	14.3	9.3	33.3	12.5	18.2	11.8	12.0	16.7
		%***	1.7	2.2	6.7	1.1	2.2	1.1	1.7	16.7
	A	No.	8	9	9	5	7	9	6	53
		%	38.1	20.9	25.0	31.3	31.8	52.9	24.0	29.4
		%	4.4	5.0	5.0	2.8	3.9	5.0	3.3	29.4
	N	No.	7	24	13	8	11	6	12	81
		%	33.3	55.8	36.1	50.0	50.0	35.5	48.0	45.0
		%	3.9	13.3	7.2	4.4	4.4	3.3	6.7	45.0
	D	No.	1	6	2	1			4	14
		%	4.8	14.0	5.6	6.3	0	0	16.0	7.8
		%	0.6	3.3	1.1	0.6			2.2	7.8
	SD	No.	2							2
		%	9.5	0	0	0	0	0	0	1.1
		%	1.1							1.1
Total		No.	21	43	36	16	22	17	25	180
		%	100.	100.	100.	100.0	100.0	100.0	100.0	100.0
		%	0	0	0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*%=Within Branch

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When frequency of responses to the appropriateness of a system-based OE model variable were assessed by PSO managers' position titles (Table 7.13), of the 120 managers who declared their position title, more than half of the managers of different ranks (52.5 per cent of the total, including 53.8 percent of top managers and 63.7 per cent of middle managers) were supportive of the system-based OE model, while only about one-third (37.5 per cent) were undecided on the issue, and only 10 per cent disagreed.

A Chi-square test did not find significant differences between different categories of the system-based OE model variable and various position titles of managers, nor did Kruskal-Wallis test (Chi-square value of 3.095 was significant at .377 [ $p>0.05$ ], with 3 degrees of freedom). Further, when 4 managers' position titles were aggregated into Junior and Senior managers, neither Mann-Whitney nor Kolmogorov-Smirnov could find significant differences between the two variables (significant at .140 and .673 respectively [ $p>0.05$ ]).

**Table 7.13: Overall Appropriateness of A System-based OE Model Responses by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Appropriateness of A System- based OE Model	SA	No.	5	6	9		20
		%**	17.9	13.0	27.3	0	16.7
		%***	4.2	5.0	7.5		16.7
	A	No.	8	16	12	7	43
		%	28.8	34.8	36.4	53.8	35.8
		%	6.7	13.3	10.0	5.8	35.8
	N	No.	11	19	9	6	45
		%	39.3	41.3	27.3	46.2	37.5
		%	9.2	15.8	7.5	5.0	37.5
	D	No.	4	4	3		11
		%	14.3	8.7	9.1	0	9.2
		%	3.3	3.3	2.5		9.2
	SD	No.		1			1
		%	0	2.2	0	0	0.8
		%		0.8			0.8
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers  
2=Department Heads  
3=Middle Managers  
4=Top Managers

\*\*%=Within Position Title  
\*\*\*%=of the Total

SA=Strongly Agree  
A=Agree  
N=Neutral  
D=Disagree  
SD=Strongly Disagree

When the frequency of PSO manager's responses to the system-based OE model item was compared with their tertiary education levels (Table 7.14), managers possessing Master degree were almost equally divided in supporting the model and being undecided (45.4 and 47.3 per cent respectively). This comparison showed almost the same results for managers holding Bachelor degree—46.4 per cent being in favour and 44.0 per cent being undecided on the issue, while overall (Masters and Bachelors) only 8.9 per cent were totally against the proposal.

A Chi-square test did not reveal any significant differences between the appropriateness of a system-based model and managers' education levels variables (Chi-square value of 2.024 significant at .731 [ $p>0.05$ ]), nor did a Mann-Whitney test (significant at .804 [ $p>0.05$ ]). Further, Kolmogorov-Smirnov test also did not find any significant difference between the two variables.

**Table 7.14: Overall Appropriateness of A System-based OE Model Responses by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Appropriateness of A System-based OE Model	SA	No.	7	23	30
		%*	12.7	18.4	16.7
		%**	3.9	12.8	16.7
	A	No.	18	35	53
		%	32.7	28.0	29.4
		%	10.0	19.4	29.4
	N	No.	26	55	81
		%	47.3	44.0	45.0
		%	14.4	30.6	45.0
	D	No.	3	11	14
		%	5.5	8.8	7.8
		%	1.7	6.1	7.8
	SD	No.	1	1	2
		%	1.8	0.8	1.1
		%	0.6	0.6	1.1
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the results of system-based OE model item were evaluated by the result of future consideration of proposed model (Table 7.15), 88.7 per cent of PSO managers of different locations, positions, and educational levels agreed to consider the proposed OE model for assessing the effectiveness of their organisation in the future. However, many comments were made on the survey questionnaires relating to this item. Comments such as ‘may be’, ‘with amendments’, and ‘if my suggestions are amended’, were common.

Chi-square, and Mann-Whitney, tests revealed significant differences between the system-based OE model variable and future consideration of proposed model variable. The Chi-square test value of 22.307 was significant at .000 but more than 20 per cent of the cells had an expected count of less than 5 making the chi-square figure suspect. The Mann-Whitney test showed that significant differences existed between the two variables, differences that were significant at .011 ( $p<0.05$ ). However, Kolmogorov-Smirnov test did not find significant differences between the two variables (the Z value of 1.223 was significant at .100, [ $p>0.05$ ]).

**Table 7.15: Overall Appropriateness of A System-based OE Model Responses by Future Consideration of the Proposed Model**

		Future Consideration of the Proposed Model		Total
		Yes	No	
Appropriateness of A System-based OE Model (Total)	No. %	157 88.7	20 11.3	177 100.0

4.2.1. Summary

This section examined PSO managers’ responses to ‘Appropriateness of a System-based Model for Regular OE Assessment’ item. The variable was self assessed and measured using a 5-point Likert scale from ‘Strongly Disagree’ to ‘Strongly Agree’.

The analysis indicated that the frequencies of responses were approximately normally distributed, and there were high significant statistical differences between the frequencies of response categories. The differences were predominantly between managers who were undecided and those who agreed and strongly agreed on the

appropriateness of a system-based OE model, a result that may have been affected by the novelty of the model.

There were also marginal statistically significant differences between 'Appropriateness of a System-based Model for Regular OE Assessment' variable and organisation location variable. Managers in H.Q., B.I.K., and Noshahr tended to be more in favour of the model, whereas managers in other branches largely indicated a neutral attitude towards the model.

Although not statistically significant, the top and middle managers indicated greater support for the system-based model compared to department heads and first line managers, a difference that could have been caused by the senior managers' in-depth understanding of the organisational systems.

There were not statistical significant differences between system-based OE model and PSO managers' education levels. That is, the proposal of a system-based model being an appropriate tool for OE assessment was not directly related to any particular managerial educational level and treated the same by managers of all qualifications.

There was however significant statistical difference between overall system-based OE model responses when assessed by future consideration of the proposed OE model responses. The managers of all ranks, locations, and educations agreed to consider the proposed model for assessing the effectiveness of their organisations in the future.

The next section will examine the effectiveness status of port organisations as a result of regular OE assessment.

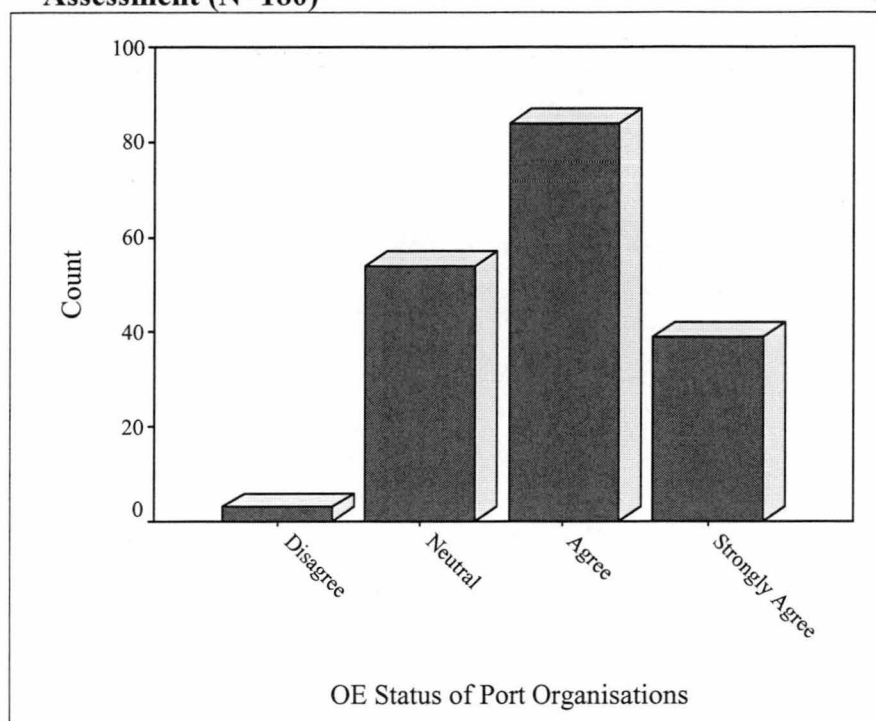
### **4.3. Effectiveness Status of Port Organisations as a Result of Regular OE Assessment:**

The section will analyse the data related to the effectiveness status of port organisations as a result of regular OE assessment which was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this

variable were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.3) shows an approximately normal distribution with a mean of 3.88 (out of 5). Both the median and mode were 4 (agree level).

**Figure 7.3: Effectiveness Status of Port Organisations as a Result of Regular OE Assessment (N=180)**



As it is shown in Figure 7.3 and Table 7.16, the majority of respondents (67.4 per cent) believed that regular OE assessment in port organisations would indicate the effectiveness status of those organisations, while only about one-third of respondents (30.0 per cent) were not certain and a very minor number of respondents (3 out of 180) disagreed on the issue.

Both the one-sample Chi-square and the one-sample Kolmogorov-Smirnov tests revealed the existence of significant differences between frequencies of response categories of effectiveness status of port organisations variable. Chi-square value of 75.600 was significant at .000 ( $p < 0.05$ ), with 3 degrees of freedom. The Kolmogorov-Smirnov value of 3.281 was also significant at .000 ( $p < 0.05$ ).



**Table 7.16: PSO Managers' Responses to Effectiveness Status of Port Organisations as a Result of Regular OE Assessment**

		Frequency	Percent (%)	Mean
<b>Effectiveness Status of Port Organisations as a Result of Regular OE Assessment</b>	<b>Strongly Agree</b>	39	21.7	3.88
	<b>Agree</b>	84	46.7	
	<b>Neutral</b>	54	30.0	
	<b>Disagree</b>	3	1.7	
	<b>Strongly Disagree</b>	0	0	
<b>Total</b>		180	100.0	

When the frequency of responses to 'Effectiveness Status of Port Organisations as a Result of Regular OE Assessment' variable were assessed by organisation location (Table 7.17), it was noted that managers in B. Abbas scored the lowest (60.8) in supporting the proposal that regular OE assessment would indicate a port organisation's status in terms of effectiveness, while all other branches showed a support of around and above 70 per cent (i.e. Noshahr 76.5%, Anzali 72.7%, H.Q. 71.4%, B.I.K. 69.4%, Bushehr 68.8%, and Chabahar 68.0%).

A Chi-square test of relatedness did not reveal significant differences between the variable in question and the organisation location (the Chi-square value of 13.800 was significant at .742 [ $p>0.05$ ]), nor did the Kruskal-Wallis (a nonparametric test equivalent to one-way ANOVA) test (Chi-square value of 4.094, significant at .664 [ $p>0.05$ ], with 6 degrees of freedom). Further, when the seven organisation branches collapsed into two categories (North and South branches), Mann-Whitney and Kolmogorov-Smirnov tests also failed to reveal significant differences between 'Effectiveness Status of Port Organisations as a Result of Regular OE Assessment' variable and organisation location (values of  $-1.280$  significant at .200 [ $p>0.05$ ], and .474 were significant at .978 [ $p>0.05$ ] respectively).

**Table 7.17: Overall Responses to Effectiveness Status of Port Organisations as a Result of Regular OE Assessment by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Effectiveness Status of Port Organisations as a Result of Regular OE Assessment	SA	No.	7	6	7	4	7	2	6	39
		%**	33.3	14.0	19.4	25.0	31.8	11.8	24.0	21.7
		%***	3.9	33.3	3.9	2.2	3.9	1.1	3.3	21.7
	A	No.	8	20	18	7	9	11	11	84
		%	38.1	46.5	50.0	43.8	40.9	64.7	44.0	46.7
		%	4.4	11.1	10.0	3.9	5.0	6.1	6.1	46.7
	N	No.	6	15	11	5	6	3	8	54
		%	28.6	34.9	30.6	31.3	27.3	17.6	32.0	30.0
		%	3.3	8.3	6.1	2.8	3.3	1.7	4.4	30.0
	D	No.	0	2	0	0	0	1	0	3
		%	0	4.7	0	0	0	5.9	0	1.7
		%		1.1				0.6		1.7
SD	No.	0	0	0	0	0	0	0	0	
	%									
	%									
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*%=Within Branch

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

As a result of evaluating the 'Effectiveness Status of Port Organisations as a Result of Regular OE Assessment' variable with PSO managers' position titles (Table 7.18), it was observed that, of the 120 managers who declared their position titles, top managers and middle managers showed an overall greater support for the proposal (about 77 per cent and 73 per cent respectively) as compared to first line managers and department heads.

Chi-square and Kruskal-Wallis tests did not indicate significant differences between the variable in question and the managers' position titles. The Chi-Square value of 2.564 was significant at .979 ( $p>0.05$ ), and the Kruskal-Wallis was significant at .759 ( $p>0.05$ ), with 3 degrees of freedom (Chi-square value of 1.176). Even when four managers' position titles were aggregated into Junior and Senior managers, neither Mann-Whitney nor Kolmogorov-Smirnov could find significant differences between the two variables (significant at .790 and 1.000 respectively [ $p>0.05$ ]).

**Table 7.18: Overall Responses to Effectiveness Status of Port Organisations as a Result of Regular OE Assessment by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Effectiveness Status of Port Organisations as a Result of Regular OE Assessment	SA	No.	9	10	9	3	31
		%**	32.1	21.7	27.3	23.1	25.8
		%***	7.5	8.3	7.5	2.5	25.8
	A	No.	12	21	15	7	55
		%	42.9	45.7	45.5	53.8	45.8
		%	10.0	17.5	12.5	5.8	45.8
	N	No.	7	14	8	3	32
		%	25.0	30.4	24.2	23.1	26.7
		%	5.8	11.7	6.7	2.5	26.7
	D	No.		1	1		2
		%	0	2.2	3.0	0	1.7
		%		0.8	0.8		1.7
	SD	No.					
		%					
		%					
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*%=Within Position Title

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the frequency of the 'Effectiveness Status of Port Organisations as a Result of Regular OE Assessment' item was assessed by the PSO managers' education levels (Table 7.19), a higher percentage of managers possessing a Bachelor degree (72.0 per cent) were supportive of the proposal than those holding a Master degree (60.0 per cent). Consequently, a lower percentage of managers with a Bachelor degree (28.0 per cent) were undecided on the issue as compared to those with a Master degree (34.5 per cent).

Mann-Whitney and Kolmogorov-Smirnov two-sample tests failed to reveal significant differences between the variable in question and PSO managers' education levels (significant at .063 and .641 respectively [ $p>0.05$ ]). However, Chi-square test did reveal significant differences between the two variables (value of 8.547, significant at .036, with 3 degrees of freedom).

**Table 7.19: Overall Responses to Effectiveness Status of Port Organisations as a Result of Regular OE Assessment by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Effectiveness Status of Port Organisations as a Result of Regular OE Assessment	SA	No.	9	30	39
		%*	16.4	24.0	21.7
		%**	5.0	16.7	21.7
	A	No.	24	60	84
		%	43.6	48.0	46.7
		%	13.3	33.3	46.7
	N	No.	19	35	54
		%	34.5	28.0	30.0
		%	10.6	19.4	30.0
	D	No.	3		3
		%	5.5	0	1.7
		%	1.7		1.7
	SD	No.			
		%	0	0	0
		%			
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

### 4.3.1. Summary

This section analysed PSO managers' responses to 'Effectiveness Status of Port Organisations as a Result of Regular OE Assessment' variable. The variable was self assessed and measured using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'.

There were significant statistical differences in the frequency of response categories towards the issue of 'Effectiveness Status of Port Organisations as a Result of Regular OE Assessment'. The results showed that PSO managers, regardless of their branch location, position title, and education level, largely believed that the result of regular assessment of OE would indicate the status of port organisations in terms of effectiveness.

This section found that managers in B. Abbas branch (even though agreed by about 61 per cent) were less in favour of the proposal and indicated more uncertainty (about 35 per cent) on the issue as compared to managers in all other branches, a difference that may have been affected by the size of the organisation (being the largest seaport organisation of all). However, these differences were not statistically significant

There were no statistical significant differences between 'Effectiveness Status of Port Organisations as a Result of Regular OE Assessment' variable when evaluated by PSO managers' position titles. That is, this variable proved to be independent of managers' position of all ranks. However, the result indicated that top and middle managers stood comparatively higher in supporting the proposal than department heads and first line managers.

There was also a statistical significant difference between the frequencies of response categories of the tested variable when assessed by educational levels of managers, with majority of PSO managers possessing Bachelor degree being supportive of the proposal as compared to those holding Master degree.

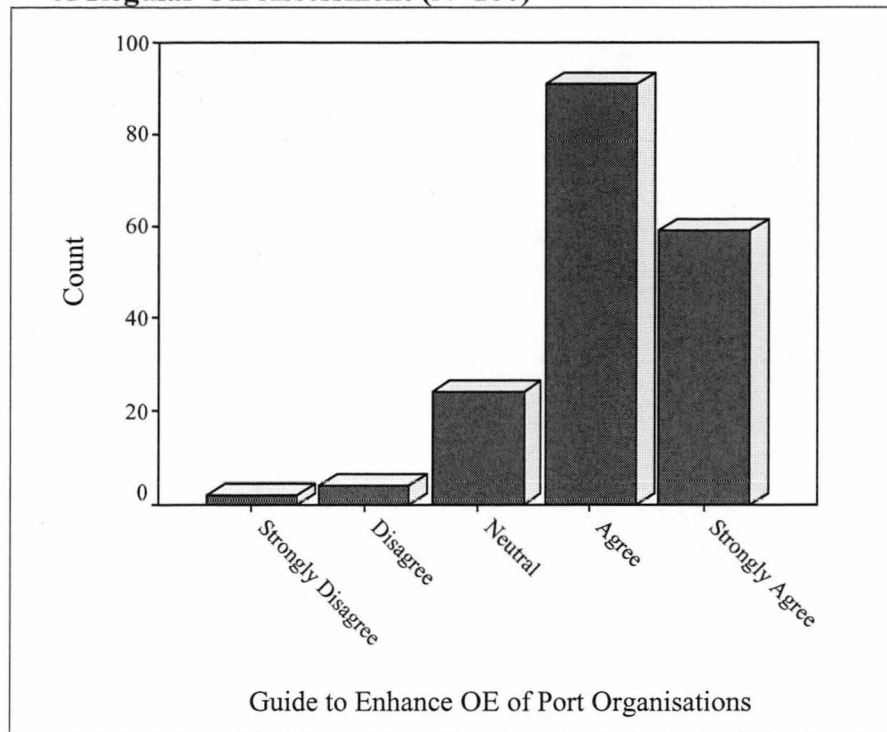
Next section will evaluate the results of future enhancement of effectiveness in port organisations as a result of regular OE assessment.

#### **4.4. Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment**

The variable 'Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment' was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.4) shows a skewed distribution with a mean of 4.12 (out of 5). Both the median and mode were 4 (agree level).

**Figure 7.4: Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment (N=180)**



As can be noted from Figure 7.4 and Table 7.20, PSO managers of different branches, ranks, and educational levels extensively (83.4 per cent) believed that the results of regular OE assessments could be used as a guide to enhance the port organisations' effectiveness in the future.

The above emphasis was also evidenced in Chi-square and Kolmogorov-Smirnov one-sample tests that revealed significant differences in the variable's frequencies of response categories. The Chi-square value of 163.278 was significant at .000 ( $p < 0.05$ ), with 4 degrees of freedom, and the Kolmogorov-Smirnov Z value of 3.694 was significant at .000 ( $p < 0.05$ ).

**Table 7.20: PSO Managers' Responses to Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment**

		Frequency	Percent (%)
<b>Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment</b>	<b>Strongly Agree</b>	59	32.8
	<b>Agree</b>	91	50.6
	<b>Neutral</b>	24	13.3
	<b>Disagree</b>	4	2.2
	<b>Strongly Disagree</b>	2	1.1
<b>Total</b>		180	100.0

Breakdown of response frequencies of 'Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment' variable by organisation location (Table 7.21) disclosed that managers in Noshahr, Bushehr, and Headquarters expressed their highest support for the proposal (88.3, 87.6, and 85.7 per cent respectively). In addition, the rate of neutral responses was comparatively lower than (13.3 per cent) those of the two previous variables (45 and 30 per cent respectively, see Tables 7.12 and 7.17).

A Chi-square test did not reveal significant differences between the above two variables (value of 10.494 was significant at .824 [ $p>0.05$ ]), nor did a Kruskal-Wallis test (Chi-square value of 1.688 was significant at .946 [ $p>0.05$ ], with 6 degrees of freedom). Even when the seven PSO branches aggregated into two categories (North and South branches), Mann-Whitney and Kolmogorov-Smirnov tests also failed to reveal significant differences between the 'Effectiveness Status of Port Organisations as a Result of Regular OE Assessment' variable and the organisation location (significant at .743 [ $p>0.05$ ], and 1.000 [ $p>0.05$ ] respectively).

**Table 7.21: Overall Responses to Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment	SA	No.	7	14	14	5	6	7	6	59
		%**	33.3	32.6	38.9	31.3	27.3	41.2	24.0	32.8
		%***	3.9	7.8	7.8	2.8	3.3	3.9	3.3	32.8
	A	No.	11	21	15	9	12	8	15	91
		%	52.4	48.8	41.7	56.3	54.5	47.1	60.0	50.6
		%	6.1	11.7	8.3	5.0	6.7	4.4	8.3	50.6
	N	No.	3	5	6	2	3	2	3	24
		%	14.3	11.6	16.7	12.5	13.6	11.8	12.0	13.3
		%	1.7	2.8	3.3	1.1	1.7	1.1	1.7	13.3
	D	No.		2	1		1			4
		%	0	4.7	2.8	0	4.5	0	0	2.2
		%		1.1	0.6		0.6			2.2
	SD	No.		1					1	2
		%	0	2.3	0	0	0	0	4.0	1.1
		%		0.6					0.6	1.1
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*%=Within Branch

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the frequencies of 'Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment' variable was assessed by PSO managers' position titles (Table 7.22), very high percentage of top managers (92.3 per cent) followed by first line managers (85.7 per cent) and middle managers (81.8 per cent) were in favour of the proposal. This comparison also revealed that none of the PSO's top managers was against the proposal.

A Kruskal-Wallis test did not find significant differences between the above-mentioned variable and different managerial position titles (Chi-square value of 1.547, with 3 degrees of freedom, significant at .671 [ $p>0.05$ ]), nor did a Chi-square test of relatedness (value of 4.815, significant at .964 [ $p>0.05$ ]). Further, when four managers' position titles were aggregated into Junior and Senior managers, Mann-Whitney and Kolmogorov-Smirnov tests also failed to reveal significant differences between the two variables (significant at .432 and 1.000 respectively [ $p>0.05$ ]).



**Table 7.22: Overall Responses to Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment	SA	No.	10	13	13	4	40
		%**	35.7	28.3	39.4	30.8	33.3
		%***	8.3	10.8	10.8	3.3	33.3
	A	No.	14	22	14	8	58
		%	50.0	47.8	42.4	61.5	48.3
		%	11.7	18.3	11.7	6.7	48.3
	N	No.	3	9	4	1	17
		%	10.7	19.6	12.1	7.7	14.2
		%	2.5	7.5	3.3	0.8	14.2
	D	No.	1	1	1	0	3
		%	3.6	2.2	3.0	0	2.5
		%	0.8	0.8	0.8		2.5
	SD	No.		1	1		2
		%	0	2.2	3.0	0	1.7
		%		0.8	0.8		1.7
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers  
2=Department Heads  
3=Middle Managers  
4=Top Managers

\*\*%=Within Position Title  
\*\*\*%=of the Total

SA=Strongly Agree  
A=Agree  
N=Neutral  
D=Disagree  
SD=Strongly Disagree

Evaluation of the ‘Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment’ item by the managers’ educational levels (Table 7.23) revealed that all managers, possessing either a Master degree or a Bachelor degree, were about the same in corroborating the proposal (85.5 and 82.4 per cent respectively). This lack of difference between the two variables was backed up by Chi-square, Mann-Whitney, and Kolmogorov-Smirnov tests that failed to find any significant differences. The Chi-square value of 1.834 was significant at .766 ( $p>0.05$ ), with 4 degrees of freedom. The Mann-Whitney test value of  $-1.033$  was significant at .302 ( $p>0.05$ ). The Kolmogorov-Smirnov Z value of .481 was significant at .975 ( $p>0.05$ ).

**Table 7.23: Overall Responses to Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment	SA	No.	21	38	59
		%*	38.2	30.4	32.8
		%**	11.7	21.1	32.8
	A	No.	26	65	91
		%	47.3	52.0	50.6
		%	14.4	36.1	50.6
	N	No.	7	17	24
		%	12.7	13.6	13.3
		%	3.9	9.4	13.3
	D	No.	1	3	4
		%	1.8	2.4	2.2
		%	0.6	1.7	2.2
	SD	No.	0	2	2
		%	0	1.6	1.1
		%	0	1.1	1.1
Total	No.	55	125	180	
	%	100.0	100.0	100.0	
	%	30.6	69.4	100.0	

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

#### 4.4.1. Summary

This section examined PSO managers' responses to 'Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment' item. The variable was self assessed and measured using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'.

There were significant statistical differences in the frequency of response categories towards the issue of 'Future Enhancement of Effectiveness in Port Organisations as a Result of Regular OE Assessment'. The majority of PSO managers believed that the results of OE assessments on a regular basis could be used as a guide to enhance the effectiveness of port organisations in the future.

Managers in Noshahr, Bushehr, and H.Q. stood relatively higher in supporting the variable as compared to managers in all other branches. However, the differences were not statistically significant. That is, the variable was not related to any particular branch.

Although not statistically significant, top managers showed a very high support for the variable as compared to other managerial positions. Again, the result showed that the variable was independent of all managerial positions.

There were also no statistical significant differences between this variable and managers' educational levels, and managers of different educational levels showed same attitude towards corroboration of this variable.

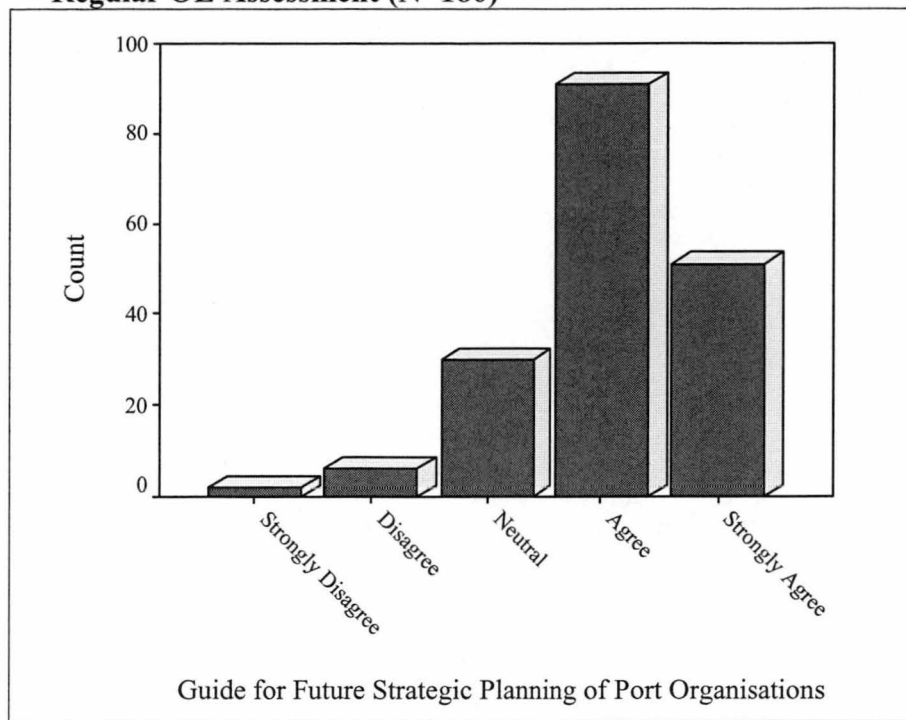
Next section will examine future strategic planning of the port organisations as a result of regular OE assessment.

#### **4.5. Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment**

The variable 'Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment' was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.5) shows a skewed distribution with a mean of 4.02 (out of 5). Both the median and mode were 4 (agree level).

**Figure 7.5: Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment (N=180)**



As it is shown in Figure 7.5 and Table 7.24, a total of 142 managers (or about 79 per cent) of PSO reached a consensus to support the proposal that the results of regular OE assessments could be used as a guide for future strategic (long-term) planning of the port organisations. This major consensus was also supported by a one-sample Chi-square test that found significant differences between the different frequencies of responses (value of 148.389, with 4 degrees of freedom, significant at .000 [ $p < 0.05$ ]), and a Kolmogorov-Smirnov one-sample test (Z value of 3.768 significant at .000 [ $p < 0.05$ ]).

**Table 7.24: PSO Managers' Responses to Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment**

		Frequency	Percent (%)
Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment	Strongly Agree	51	28.3
	Agree	91	50.6
	Neutral	30	16.7
	Disagree	6	3.3
	Strongly Disagree	2	1.1
Total		180	100.0

When the frequency of responses to the 'Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment' item was evaluated by organisation location (Table 7.25), above 80 per cent of PSO managers in Noshahr, B.I.K., Chabahar, and H.Q. expressed their high support for the proposal (88.2, 85.8, 84.0, and 81.0 per cent respectively), while the total rate of negative responses being as low as 4.4 per cent.

A Chi-square test of relatedness did not reveal significant differences between 'Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment' variable and organisation location (value of 21.083 significant at .634 [ $p>0.05$ ]), nor did a Kruskal-Wallis test (Chi-square value of 10437, with 6 degrees of freedom, significant at .107 [ $p>0.05$ ]). Aggregation of seven branches into North and South branches could not help Mann-Whitney and Kolmogorov-Smirnov tests to find significant differences between the two variables (significant at .783 and 1.000 [ $p>0.05$ ] respectively).

**Table 7.25: Overall Responses to Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment	SA	No.	6	10	12	3	3	9	8	51
		%**	28.6	23.3	33.3	18.8	13.6	52.9	32.0	28.3
		%***	3.3	5.6	6.7	1.7	1.7	5.0	4.4	28.3
	A	No.	11	22	19	8	12	6	13	91
		%	52.4	51.2	52.8	50.0	54.5	35.3	52.0	50.6
		%	6.1	12.2	10.6	4.4	6.7	3.3	7.2	50.6
	N	No.	3	7	4	4	7	2	3	30
		%	14.3	16.3	11.1	25.0	31.8	11.8	12.0	16.7
		%	1.7	3.9	2.2	2.2	3.9	1.1	1.7	16.7
	D	No.	1	2	1	1			1	6
		%	4.8	4.7	2.8	6.3	0	0	4.0	3.3
		%	0.6	1.1	0.6	0.6			0.6	3.3
	SD	No.		2						2
		%	0	4.7	0	0	0	0	0	1.1
		%		1.1						1.1
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*0%=Within Branch

\*\*\*0%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Assessing the 'Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment' variable by PSO managers' position titles (Table 7.26) revealed that, of the 120 managers who declared their position titles, a very high percentage of middle managers (87.8 per cent, or 29 managers out of 33) were in favour of the proposal. This figure was followed by first line managers (82.1 per cent), top managers (76.9 per cent), and department heads (74.0 per cent) respectively.

The Chi-square and Kruskal-Wallis tests failed to reveal significant differences between these two variables. The Pearson Chi-square value of 6.148 was significant at .908 ( $p>0.05$ ), and Kruskal-Wallis's Chi-square value of 1.839 was significant at .606 ( $p>0.05$ ), with 3 degrees of freedom. Even when the four managerial position titles were collapsed into Junior and Senior titles, Mann-Whitney and Kolmogorov-Smirnov tests also could not find any significant differences between the two variables (significant at .483 and .996 [ $p>0.05$ ] respectively).

**Table 7.26: Overall Responses to Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment	SA	No.	9	13	11	3	36
		%**	32.1	28.3	33.3	23.1	30.0
		%***	7.5	10.8	9.2	2.5	30.0
	A	No.	14	21	18	7	60
		%	50.0	45.7	54.5	53.8	50.0
		%	11.7	17.5	15.0	5.8	50.0
	N	No.	4	8	4	3	19
		%	14.3	17.4	12.1	23.1	15.8
		%	3.3	6.7	3.3	2.5	15.8
	D	No.	1	3			4
		%	3.6	6.5	0	0	3.3
		%	0.8	2.5			3.3
	SD	No.		1			1
		%	0	2.2	0	0	0.8
		%		0.8			0.8
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*%=Within Position Title

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the ‘Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment’ variable was evaluated by PSO managers’ educational level (Table 7.27), not much difference was found between managers’ (with different educational categories) attitudes in supporting the issue (Masters 80.0 per cent and Bachelors 78.4 per cent). This lack of difference was also confirmed by a Chi-square test of relatedness, a Mann-Whitney test, and a Kolmogorov-Smirnov test (all these tests showed a *p* value of greater than 0.05).

**Table 7.27: Overall Responses to Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment by Managers’ Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment	SA	No.	17	34	51
		%*	30.9	27.2	28.3
		%**	9.4	18.9	28.3
	A	No.	27	64	91
		%	49.1	51.2	50.6
		%	15.0	35.6	50.6
	N	No.	9	21	30
		%	16.4	16.8	16.7
		%	5.0	11.7	16.7
	D	No.	2	4	6
		%	3.6	3.2	3.3
		%	1.1	2.2	3.3
	SD	No.		2	2
		%	0	1.6	1.1
		%		1.1	1.1
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

#### 4.5.1. Summary

This section examined PSO managers’ attitudes towards ‘Future Strategic Planning of the Port Organisations as a Result of Regular OE Assessment’ variable. The variable was self assessed and measured using a 5-point Likert scale from ‘Strongly Disagree’ to ‘Strongly Agree’.

The analysis of this variable found that there were statistical significant differences between frequencies of different response categories of the variable in question. The analysis results showed that a high number of PSO managers reached a consensus that the results of regular OE assessments could be used as a guide for future strategic (long-term) planning of the port organisations.

Although not statistically significant, this section found that a relatively higher percentage of managers in Noshahr, B.I.K., Chabahar, and H.Q. branches were in favour of the proposal as compared to managers in all other branches.

This section also revealed that middle managers stood higher in supporting the variable than top managers, department heads, and first line managers. However, this difference was not statistically significant.

Finally, there were also no statistical significant differences between this variable and managers' educational levels, and managers of different educational levels showed same attitude towards corroboration of this variable. That is, the variable was independent of any specific managerial education level.

Next section will examine the 'Indication of Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' variable.

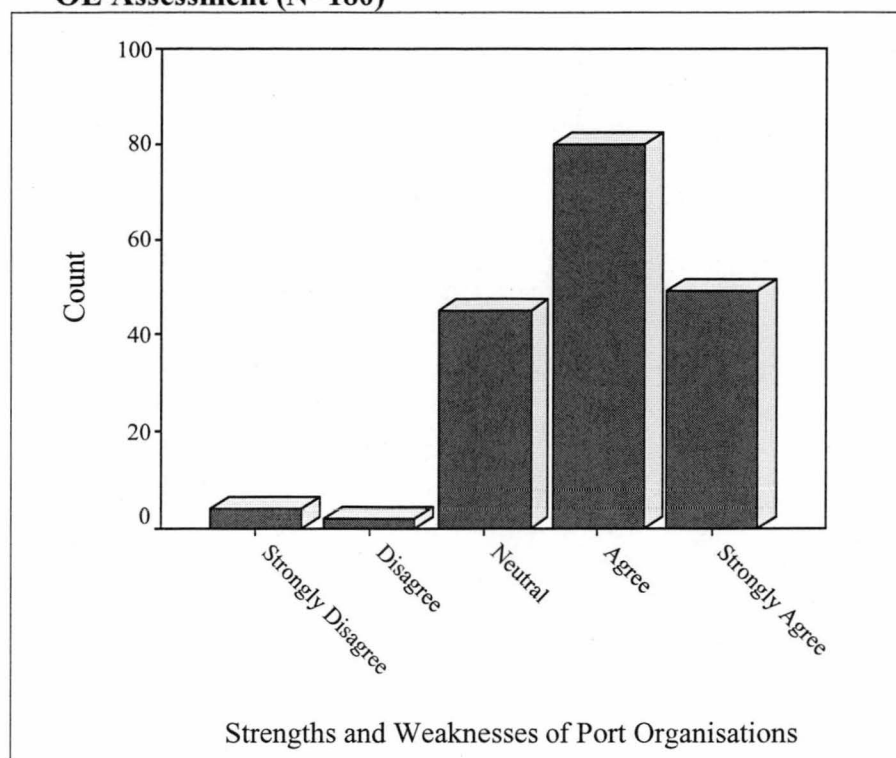
#### **4.6. Indication of Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment**

The variable 'Indication of Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.6) shows a slightly more normal distribution with a mean of 3.93 (out of 5). Both the median and mode were 4 (agree level).



**Figure 7.6: Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment (N=180)**



As can be seen from Figure 7.6 and Table 7.28, even though a large majority of respondents (129 managers or 71.6 per cent) were supportive of the idea that the results of regular OE assessments would give an indication of port organisation's strengths and weaknesses, but comparatively a considerable number of managers (45 managers or 25.0 per cent) were undecided on the issue.

Both chi-square test and Kolmogorov-Smirnov tests found significant differences between the frequencies of response categories of the above-mentioned variable. The Pearson Chi-square value of 121.278, with 4 degrees of freedom, was significant at .000 ( $p < 0.05$ ), and Kolmogorov-Smirnov Z value of 3.314 was significant at .000 ( $p < 0.05$ ).

**Table 7.28: PSO Managers' Responses to Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment**

		Frequency	Percent (%)
<b>Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment</b>	<b>Strongly Agree</b>	49	27.2
	<b>Agree</b>	80	44.4
	<b>Neutral</b>	45	25.0
	<b>Disagree</b>	2	1.1
	<b>Strongly Disagree</b>	4	2.2
<b>Total</b>		180	100.0

When the 'Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' variable was assessed by organisation location (Table 7.29), almost half of managers in Chabahar branch and about one-third of managers in H.Q. (44.0 and 28.6 per cent) were undecided over the issue, while other branches have shown a reasonably high support for the proposal (i.e. B. Abbas 74.4%, Bushehr 75%, B.I.K. 77.8%, Anzali 81.8%, and Noshahr 82.4%).

Neither the Chi-square and Kruskal-Wallis tests nor the Mann-Whitney and Kolmogorov-Smirnov tests (after aggregation of seven PSO branches into North and South branches) revealed any significant differences between the 'Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' and organisation location. Pearson Chi-square value of 30.004 was significant at .185 ( $p>0.05$ ), Kruskal-Wallis's Chi-square value of 4.282, with 6 degrees of freedom, was significant at .639 ( $p>0.05$ ), Mann-Whitney Z value of -.269 was significant at .788 ( $p>0.05$ ), and Kolmogorov-Smirnov Z value of .158 was significant at 1.000 ( $p>0.05$ ).

**Table 7.29: Overall Responses to Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment	SA	No.	6	11	10	4	5	6	7	49
		%**	28.6	25.6	27.8	25.0	22.7	35.3	28.0	27.2
		%***	3.3	6.1	5.6	2.2	2.8	3.3	3.9	27.2
	A	No.	6	21	18	8	13	8	6	80
		%	28.6	48.8	50.0	50.0	59.1	47.1	24.0	44.4
		%	3.3	11.7	10.0	4.4	7.2	4.4	3.3	44.4
	N	No.	6	9	8	4	4	3	11	45
		%	28.6	20.9	22.2	25.0	18.2	17.6	44.0	25.0
		%	3.3	5.0	4.4	2.2	2.2	1.7	6.1	25.0
	D	No.	2	0	0	0	0	0	0	2
		%	9.5	0	0	0	0	0	0	1.1
		%	1.1							1.1
	SD	No.	1	2					1	4
		%	4.8	4.7	0	0	0	0	4.0	2.2
		%	0.6	1.1					0.6	2.2
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*%=Within Branch

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Assessment of the variable in question by PSO's managerial position titles (Table 7.30) revealed that high proportion of middle managers supported the variable followed by first line managers (78.8 and 71.4 per cent respectively), while approximately one-third of top managers were undecided on the issue.

Neither the Chi-square and Kruskal-Wallis tests nor Mann-Whitney and Kolmogorov-Smirnov tests (after aggregation of four managerial position titles into Junior and Senior positions) revealed any significant differences between the two variables. Pearson Chi-square value of 5.640 was significant at .933 ( $p>0.05$ ), Kruskal-Wallis's Chi-square value of 1.188, with 3 degrees of freedom, was significant at .756 ( $p>0.05$ ), Mann-Whitney Z value of -.489 was significant at .625 ( $p>0.05$ ), and Kolmogorov-Smirnov Z value of .382 was significant at .999 ( $p>0.05$ ).

**Table 7.30: Overall Responses to Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment	SA	No.	10	11	9	4	34
		%**	35.7	23.9	27.3	30.8	28.3
		%***	8.3	9.2	7.5	3.3	28.3
	A	No.	10	20	17	5	52
		%	35.7	43.5	51.5	38.5	43.3
		%	8.3	16.7	14.2	4.2	43.3
	N	No.	8	13	6	4	31
		%	28.6	28.3	18.2	30.8	25.82
		%	6.7	10.8	5.0	3.3	5.8
	D	No.		1			1
		%	0	2.2	0	0	0.8
		%		0.8			0.8
	SD	No.		1	1		2
		%	0	2.2	3.0	0	1.7
		%		0.8	0.8		1.7
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*%=Within Position Title

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the 'Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' variable was evaluated PSO managers' educational levels (Table 7.31), managers possessing a Bachelor degree stood slightly higher in supporting the variable as compared to those with a Master degree (73.6 and 67.3 per cent respectively). Consequently, the rate of undecided managers with a Master degree over this issue was higher.

A Chi-square test of relatedness, Mann-Whitney test, and Kolmogorov-Smirnov test all failed to reveal significant differences between these two variables. The Pearson Chi-square value of 1.745, with 4 degrees of freedom, was significant at .782 ( $p>0.05$ ), Mann-Whitney Z value of -.292 was significant at .770 ( $p>0.05$ ), and Kolmogorov-Smirnov Z value of .391 was significant at .998 ( $p>0.05$ ).

**Table 7.31: Overall Responses to Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment	SA	No.	16	33	49
		%*	29.1	26.4	27.2
		%**	8.9	18.3	27.2
	A	No.	21	59	80
		%	38.2	47.2	44.4
		%	11.7	32.8	44.4
	N	No.	16	29	45
		%	29.1	23.2	25.0
		%	8.9	16.1	25.0
	D	No.	1	1	2
		%	1.8	0.8	1.1
		%	0.6	0.6	1.1
	SD	No.	1	3	4
		%	1.8	2.4	2.2
		%	0.6	1.7	2.2
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

#### 4.6.1. Summary

This section examined PSO managers' attitudes towards 'Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' variable. The variable was self assessed and measured using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'.

There were significant statistical differences between the frequencies of response categories towards the issue of the results of regular OE assessment would indicate port organisation's strengths and weaknesses. The results showed that the PSO managers were largely in favour of this issue, however a considerable number of managers (45 managers or 25.0 per cent) were undecided on the issue.

Although not statistically significant when 'Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' variable was evaluated by

organisation location, this section found that the variable in question was independent of the organisation location. In other words, majority of PSO managers, regardless of their organisation branch and size, had the same high support for the proposal, except managers in Chabahar and H.Q. who showed a relatively high rate of uncertainty.

There were also no statistical significant differences between 'Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' variable and PSO managers' position titles. That is, this proposal was not related to any particular position in the organisation and treated the same by managers of different ranks. However, this section revealed that all PSO middle managers, who responded to the survey, stood slightly higher than other managers in supporting the proposal.

Although there was not any statistical significant differences between 'Port Organisation's Strengths and Weaknesses as a Result of Regular OE Assessment' variable and managers' education levels (i.e. the variable was independent of educational level), the analysis in this section found that the managers possessing a Bachelor degree were more supportive of the proposal as compared to those with a Master degree.

#### **4.7. Correlations between Regular OE Assessment Variables**

As the data relating to six variables of regular OE assessments have been previously described and shown to be fundamentally reliable and valid, this section and its sub-sections will discuss the relationship between the 'Regular OE Assessment' variable (treated as a pivot variable) and the other five variables. As previously described, all these variables were measured on a 5-point Likert scale. Due to the nature of the data (ordinal), an appropriate nonparametric correlation technique should be used for correlations between these variables.

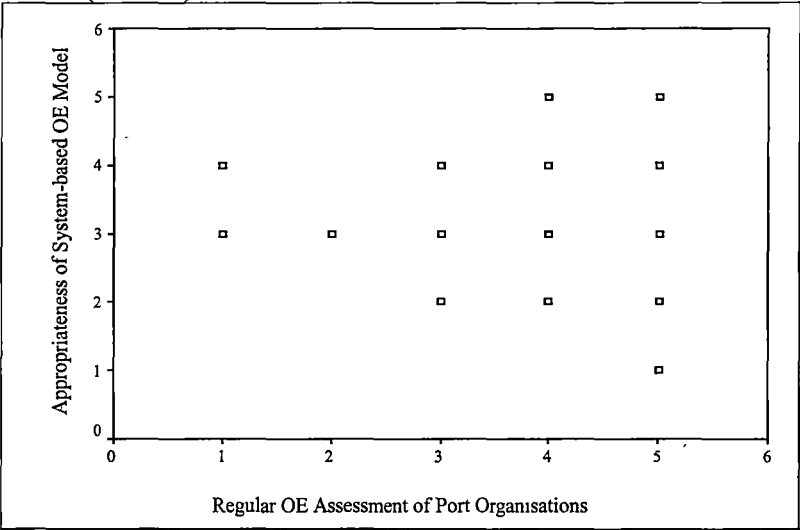
Of all the statistics on ordinal data, the Spearman rank-order correlation coefficient (Spearman's rho) was the earliest to be developed and is perhaps the best known today (Siegel & Castellan 1988). Therefore, the Spearman's rho correlation technique was found to be appropriate in measuring the degree of association between the variables. In addition to presenting measures of association, the Spearman's rho coefficient was used

to determine the significance of the observed associations (Phillips 1996), the results of which are shown in Appendix 10.

4.7.1. Regular OE Assessment and Appropriateness of System-based OE Model

The scatterplot of the two variables is shown in Figure 7.7. The figure generally shows a positive slope correlation, reflecting Spearman’s rho correlation of .222 that was highly significant as indicated by the *p*-value (Appendix 10), at 99 per cent level of confidence (.003, *p*<0.01).

Figure 7.7: Regular OE Assessment and Appropriateness of System-based OE Model (N=180)



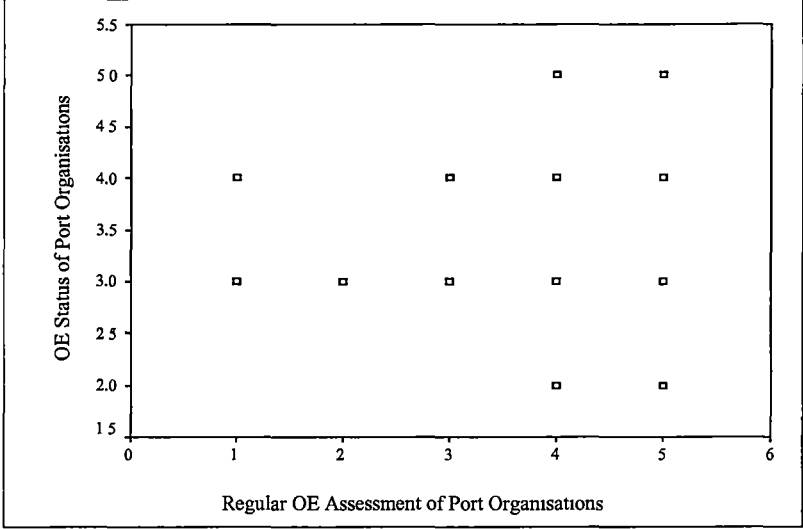
The result of Spearman’s rho correlation and its test of significance showed that the regular assessment of OE in seaport organisations was associated and significantly differed with appropriateness of a system-based OE model for regular OE assessment variable.

4.7.2. Regular OE Assessment and Effectiveness Status of Port Organisations

The scatterplot of the two variables is shown in Figure 7.8. The figure generally shows a positive slope correlation, reflecting Spearman’s rho correlation of .241 that was highly

significant as indicated by the  $p$ -value (Appendix 10), at 99 per cent level of confidence (.001,  $p<0.01$ ).

**Figure 7.8: Regular OE Assessment and Effectiveness Status of Port Organisations (N=180)**



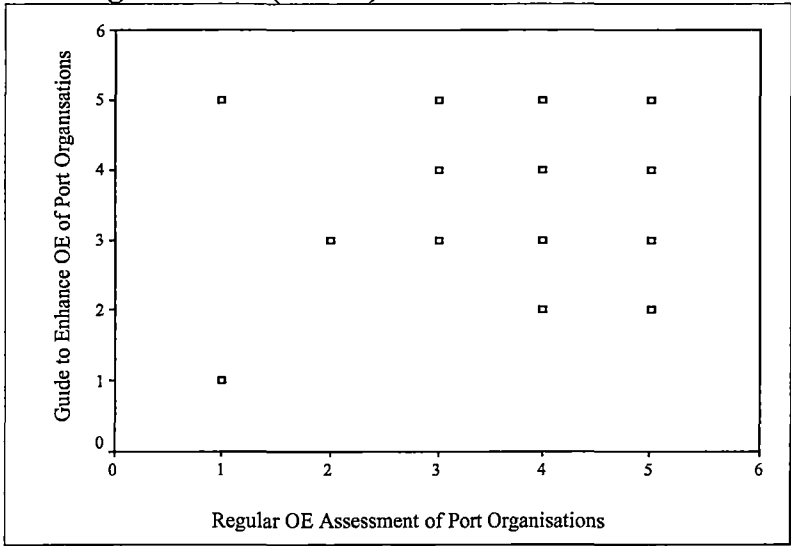
The result of Spearman’s rho correlation and its test of significance showed that the regular assessment of OE in port organisation was associated and significantly differed with status of port organisations in terms of effectiveness variable.

#### **4.7.3. Regular OE Assessment and Guide to Future Enhancement of OE in Port Organisations**

The scatterplot of the two variables is shown in Figure 7.9. The figure generally shows a positive slope correlation, reflecting Spearman’s rho correlation of .175 that was significant as indicated by the  $p$ -value (Appendix 10), at 95 per cent level of confidence (.019,  $p<0.05$ ).



**Figure 7.9: Regular OE Assessment and Guide to Future Enhancement of OE in Port Organisations (N=180)**

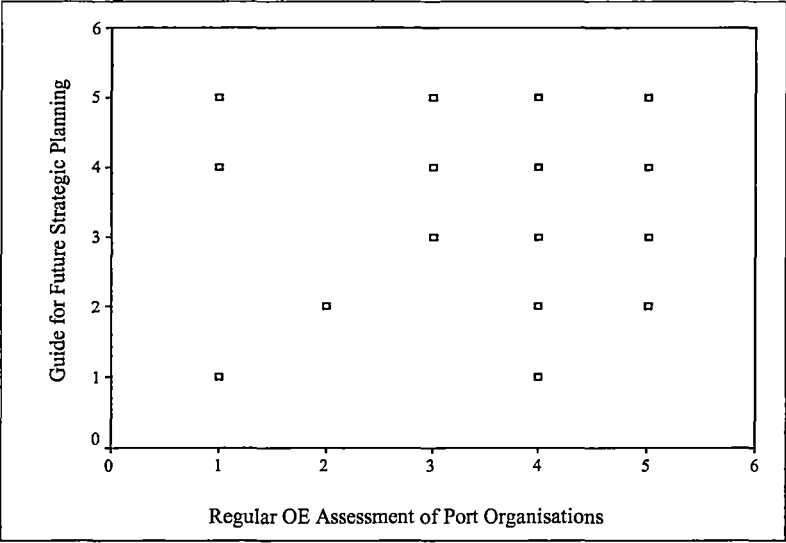


The result of Spearman’s rho correlation and its test of significance showed that the regular assessment of OE in port organisation was correlated and significantly differed with guide to future enhancement of OE in port organisations variable.

**4.7.4. Regular OE Assessment and Guide for Future Strategic Planning in Port Organisations**

The scatterplot of the two variables is shown in Figure 7.10. The figure generally shows a neutral slope correlation, reflecting Spearman’s rho correlation of .087 that was not significant as indicated by the *p*-value (Appendix 10), at 95 per cent level of confidence (.248,  $p>0.05$ ).

**Figure 7.10: Regular OE Assessment and Guide for Future Strategic Planning in Port Organisations (N=180)**

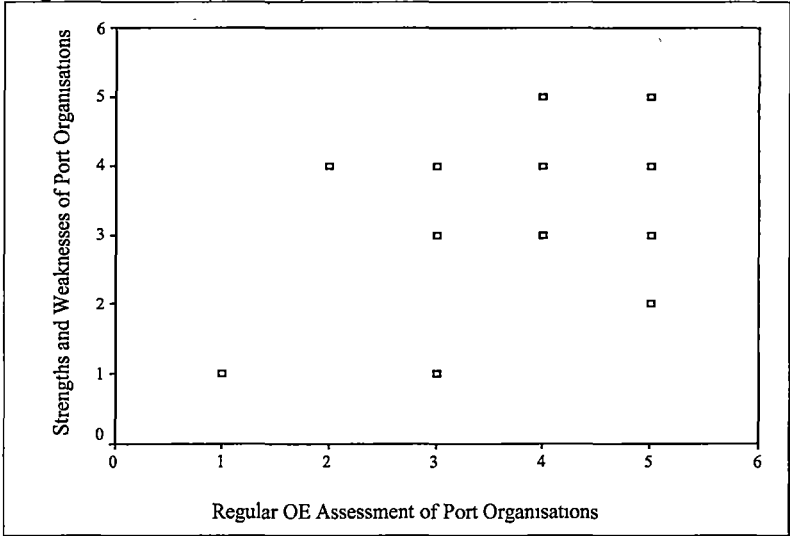


The result of Spearman’s rho correlation and its test of significance showed that the regular assessment of OE in port organisation was not correlated and did not significantly differ with guide for future strategic planning in port organisations variable.

**4.7.5. Regular OE Assessment and Strengths and Weaknesses of Port Organisations**

The scatterplot of the two variables is shown in Figure 7.11. The figure generally shows a positive slope correlation, reflecting Spearman’s rho correlation of .375 that was highly significant as indicated by the *p*-value (Appendix 10), at 99 per cent level of confidence (.000,  $p<0.01$ ).

**Figure 7.11: Regular OE Assessment and Strengths and Weaknesses of Port Organisations (N=180)**



The result of Spearman’s rho correlation and its test of significance showed that the regular assessment of OE in port organisation was associated and significantly differed with strength and weakness of port organisations variable.

**4.7.6. Correlation Summary**

This section examined the existence of possible correlation between different variables of regular OE assessment in port organisations using scatterplots and Spearman’s rho correlation coefficients.

There were correlations and significant differences between the proposal of ‘Regular OE Assessment in Port Organisations’ and the following variables:

- Appropriateness of a system-based OE model for regular assessment of port organisations’ effectiveness;
- Indication of port organisations’ effectiveness status as a result of regular OE assessment;
- Guidance to future enhancement of port organisations’ effectiveness as a result of regular OE assessment; and

- Indication of port organisations' strengths and weaknesses as a result of regular OE assessment.

There was however no evidence of a significant relationship between 'Regular OE Assessment' and 'Guidance for Future Strategic Planning of the Port Organisations' variables.

The next section will examine the data relating to relationships between port organisations' effectiveness and their operational performance.

## **5. The Impacts of Seaports' Greater Operational Performance (OP) as a Result of Higher OE of Their Organisations**

This section examines the second research question and hypothesis and discusses the related results obtained from the survey as related to question 2 and hypothesis 2:

- Q2.** What are the possible positive impacts of improved operational performance of seaports on development, as a result of higher OE of their organisation? What is the relationship between these impacts and organisation location, managers' ranks, and managers' education levels?
- H2.** Greater seaports' operational performance, as a result of higher OE, will have positive impacts on development, regardless of their location, managers' ranks, and managers' education levels.

Different variables associated with the impacts of operational performance (OP) of seaports on country's development were self-assessed by respondents using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'. All results, analyses and tables using these variables were constructed from answers to questions in the survey instrument.

Similar to previous sections, items in the survey instrument related to this question and hypothesis will be statistically examined in three ways. Firstly, Cronbach's alpha and

principal component factor analysis will be discussed to test the reliability and validity of collected data. Secondly, descriptive statistics will be used to get a feel for the data. Thirdly, appropriate statistical techniques will be conducted to test the hypotheses.

The scales of 5 variables of the impacts of OP on development were analysed for inter-item consistency reliability (Cronbach's alpha reliability coefficient). The result indicated that the corrected item-total correlations were highly correlated in all 5 items, and the Cronbach's alpha ( $\alpha$ ) for the 5-item impacts of operational performance on development was at an acceptable level of about 0.83, and the factor loadings were all above 0.5 (Table 7.32) indicating that all items measured the same underlying concept. Inspection of 'Corrected Item-Total Correlation' and 'Alpha if Item Deleted' columns in Table 7.32 shows that elimination of any of these items will not increase the alpha level significantly. Therefore all items were included for further statistical analyses. Factor scores were also calculated for each of the impacts of operational performance on development items. These assessments provided adequate support for the validity and reliability of the impacts of operational performance on development items of the survey instrument.

**Table 7.32: Internal Consistency Analysis (Cronbach's alpha reliability coefficient) for Impacts of Greater OP Items**

	Corrected Item-Total Correlation	Alpha if Item Deleted	Factor Loadings	N of Cases	Alpha Score
Higher the OE, The greater the OP	.4551	.8389	0.612	180	0.8252
Impacts of greater OP, due to Higher OE, on general development	.6603	.7805	0.809		
Contribution of greater OP, due to Higher OE, to national socio-economic development	.6921	.7714	0.830		
Impacts of greater OP, due to Higher OE, on country's share of international transit trade	.7075	.7638	0.830		
Contribution of greater OP, due to Higher OE, to gaining a maritime competitive advantage	.6109	.7936	0.764		

Due to the nature of data, being the same as the first research question, almost similar statistical techniques were adopted for analysing the data associated with second question. That is, first each item/variable was individually tested by one-sample Chi-

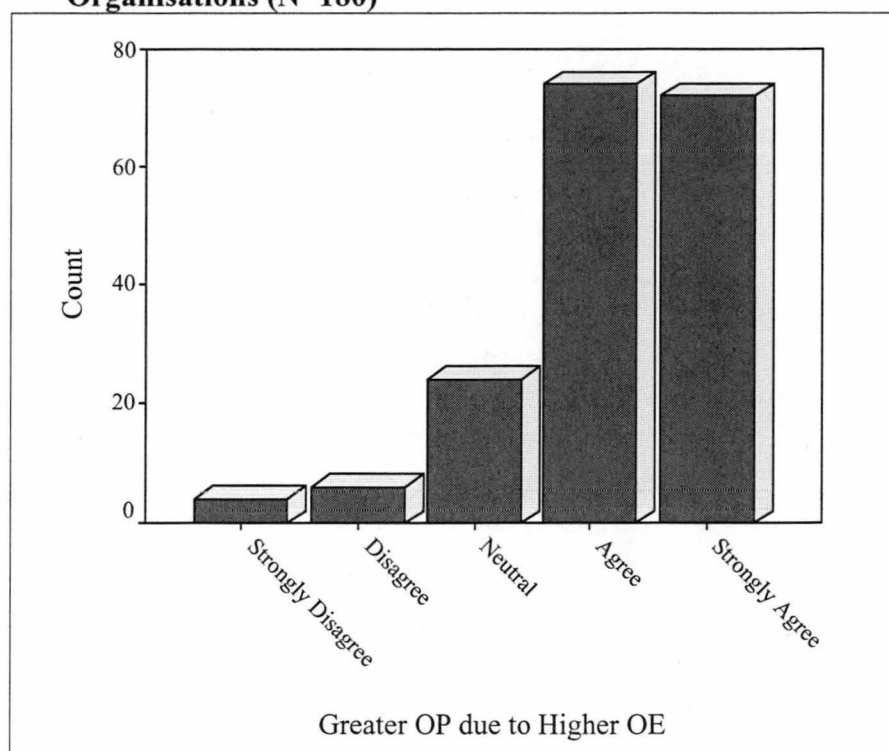
square and Kolmogorov-Smirnov one-sample tests, to ensure the existence or lack of significant differences between the frequencies of response categories of each item. Second, each variable was evaluated by organisation location, managerial position titles, and managerial education levels variables using appropriate nonparametric statistical tests, such as Chi-square test of relatedness/independence, Kruskal-Wallis several independent samples test, and Mann-Whitney and Kolmogorov-Smirnov two-independent-samples tests. These tests were carried out to reveal whether the significant differences, which were found in frequencies of responses to each item (first sets of statistical tests), were related to any particular branch, position title, or education level (hypothesis of independence tests). Third, finally the first variable (Greater Operational Performance as a Result of Higher OE) was used as a pivot variable and checked with other four resultant variables for possible correlation using Spearman's rho bivariate correlation (Spearman's rank order correlation—a nonparametric alternative to Pearson's  $r$ ) (Healey 1999).

### **5.1. Greater Seaports' Operational Performance (OP) as a Result of Higher OE of Their Organisations**

The item 'Greater Seaports' OP as a Result of Higher OE of Their Organisations' was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.12) shows a skewed distribution with a mean of 4.13 (out of 5). Both the median and mode were 4 (agree level).

**Figure 7.12: Greater Seaports' OP as a Result of Higher OE of Their Organisations (N=180)**



As can be seen from Figure 7.12 and Table 7.33, majority of PSO managers (81.1 per cent or 146 managers out of 180) extensively agreed with the proposal that greater seaports' OP would be achieved through higher OE of their organisations. While only a minority of managers indicated a neutral attitude and even lesser percentage disagreed with the issue (13.3 and 5.5 per cent respectively).

A one-sample Chi-square test and a Kolmogorov-Smirnov one-sample test revealed significant differences between different frequencies of response categories of this variable. The Chi-square value of 133.556, with 4 degrees of freedom, was significant at .000 ( $p < 0.05$ ), and Kolmogorov-Smirnov Z value of 3.404 was also significant at .000 ( $p < 0.05$ ).

**Table 7.33: PSO Managers' Responses to Seaports' Greater OP as a Result of Higher OE**

		Frequency	Percent (%)
<b>Seaports' Greater OP as a Result of Higher OE of Their Organisations</b>	<b>Strongly Agree</b>	72	40.0
	<b>Agree</b>	74	41.1
	<b>Neutral</b>	24	13.3
	<b>Disagree</b>	6	3.3
	<b>Strongly Disagree</b>	4	2.2
<b>Total</b>		180	100.0

When the greater OP as a result of higher OE variable was assessed by organisation location (Table 7.34), PSO managers in all branches were highly supportive of the proposal (ranging between 79.0 per cent to 91.7 per cent) except those of Noshahr, who indicated the least support (58.8 per cent or 5.5 per cent of the total) and highest rate of uncertainty on the issue (29.4 per cent or 2.8 of the total).

A Chi-square test of relatedness/independence did not reveal significant differences between the variable's frequencies of response categories in various PSO branches (value of 21.005 was significant at .638 [ $p>0.05$ ]), nor did a Kruskal-Wallis test (Chi-square value of 3.144 was significant at .791 [ $p>0.05$ ], with 6 degrees of freedom). Even when the seven PSO branches were collapsed into two categories (North and South branches), Mann-Whitney and Kolmogorov-Smirnov two-sample tests also failed to reveal any significant difference between the two variables (Z values of  $-1.028$  and  $.738$  were significant at .304 and .648 [ $p>0.05$ ] respectively).



**Table 7.34: Overall Responses to Greater OP as a Result of Higher OE by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Seaports' Greater OP as a Result of Higher OE of Their Organisations	SA	No.	8	17	14	6	9	6	12	72
		%**	38.1	39.5	38.9	37.5	40.9	35.3	48.0	40.0
		%***	4.4	9.4	7.8	3.3	5.0	3.3	6.7	40.0
	A	No.	8	17	19	8	9	4	9	74
		%	38.1	39.5	52.8	50.0	40.9	23.5	36.0	41.1
		%	4.4	9.4	10.6	4.4	5.0	2.2	5.0	41.1
	N	No.	3	4	2	2	4	5	4	24
		%	14.3	9.3	5.6	12.5	18.2	29.4	16.0	13.3
		%	1.7	2.2	1.1	1.1	2.2	2.8	2.2	13.3
	D	No.	1	4				1		6
		%	4.8	9.3	0	0	0	5.9	0	3.3
		%	0.6	2.2				0.6		3.3
	SD	No.	1	1	1			1		4
		%	4.8	2.3	2.8	0	0	5.9	0	2.2
		%	0.6	0.6	0.6			0.6		2.2
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*0%=Within Branch

\*\*\*0%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Comparing the 'Greater OP as a Result of Higher OE' variable with PSO managers' position titles (Table 7.35) revealed that, of the 120 managers who declared their position title, majority of them in different ranks were in favour of the proposal but with different ratings. That is, a comparatively lower percentage of top managers supported (69.3 per cent) the variable than middle managers, department heads, and first line managers (81.9, 87.0, and 92.9 respectively). However, further inspection of table 34 revealed that only 5 managers of different ranks (or 4.2 per cent of the total) were totally against the proposal.

Kruskal-Wallis and Chi-square tests both did not find significant differences between this variable and different position titles (values of 3.205 and 11.505 were significant at .361 and .486 [ $p>0.05$ ] respectively). The aggregation of four position titles into two (Senior and Junior) also did not help Mann-Whitney and Kolmogorov-Smirnov tests to reveal any significant differences between the variables (Z values of -1.173 and .582 were significant at .241 and .887 [ $p>0.05$ ] respectively).

**Table 7.35: Overall Responses to Greater OP as a Result of Higher OE by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Seaports' Greater OP as a Result of Higher OE of Their Organisations	SA	No.	15	21	15	4	55
		%**	53.6	45.7	45.5	30.8	45.8
		%***	12.5	17.5	12.5	3.3	45.8
	A	No.	11	19	12	5	47
		%	39.3	41.3	36.4	38.5	39.2
		%	9.2	15.8	10.0	4.2	39.2
	N	No.	1	4	5	3	13
		%	3.6	8.7	15.2	23.1	10.8
		%	0.8	3.3	4.2	2.5	10.8
	D	No.	1			1	2
		%	3.6	0	0	7.7	1.7
		%	0.8			0.8	1.7
	SD	No.		2	1		3
		%	0	4.3	3.0	0	2.5
		%		1.7	0.8		2.5
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*0%=Within Position Title

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the greater OP as a result of higher OE variable was evaluated by managers' educational level (Table 7.36), a higher percentage of managers possessing a Bachelor degree were supportive of the proposal (84.8 per cent) as compared to those with a Master degree (72.7 per cent). Consequently, the result of this comparison revealed that about 22 per cent of managers possessing a Master degree were undecided on the issue.

A Mann-Whitney test did reveal marginal significant differences between the variable in question and managers' educational levels (Z value of -1.968 was significant at .049 [ $p < 0.05$ ]). Whereas, neither a Kolmogorov-Smirnov test nor a Chi-square test found significant differences between the two variables (.530 and .199 level of significance [ $p > 0.05$ ] respectively).

**Table 7.36: Overall Responses to Greater OP as a Result of Higher OE by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Seaports' Greater OP as a Result of Higher OE of Their Organisations	SA	No.	17	55	72
		%*	30.9	44.0	40.0
		%**	9.4	30.6	40.0
	A	No.	23	51	74
		%	41.8	40.8	41.1
		%	12.8	28.3	41.1
	N	No.	12	12	24
		%	21.8	9.6	13.3
		%	6.7	6.7	13.3
	D	No.	2	4	6
		%	3.6	3.2	3.3
		%	1.1	2.2	3.3
	SD	No.	1	3	4
		%	1.8	2.4	2.2
		%	0.6	1.7	2.2
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

### 5.1.1. Summary

This section analysed PSO managers' responses to 'Seaports' Greater OP as a Result of Higher OE of Their Organisations' variable. The variable was self assessed and measured using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'.

There were statistical significant differences between the frequencies of response categories of the proposal that the higher the effectiveness of a port organisation, the greater will be the operational performance of its seaports. That is a multitude of PSO managers regardless of their organisation branches, position titles, and educational levels greatly were in favour of the issue.

A comparison of the frequencies of responses to this variable with organisation location revealed that Noshahr managers stood slightly lower in supporting the proposal than managers of all other branches who indicated their maximum support. However, this

difference was not statistically significant (i.e. the variable was independent of any particular branch).

Although there were not statistical significant differences between 'Greater OP as a Result of Higher OE' variable and different PSO managers' position titles, this section found that the first line managers and department heads were more supportive of the proposal than middle and top managers. This difference may have been affected by greater involvement of junior managers with the operational aspects of seaports as compared to senior managers.

There was however significant statistical difference between the variable in question when assessed by educational levels PSO managers with managers possessing a BSc. degree being more in favour of the proposal than those with MSc. degree.

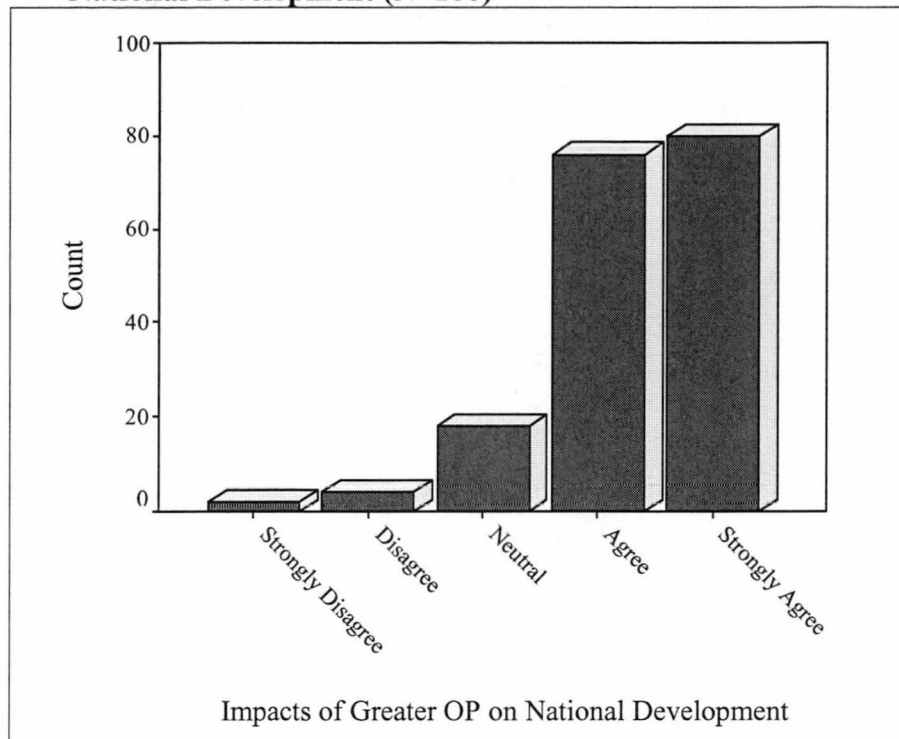
The next section will examine the impacts of greater OP on general national development.

## **5.2. The Impacts of Greater OP, as a Result of Higher OE, on National Development**

The 'Impacts of Greater OP, as a Result of Higher OE, on National Development' variable was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.13) illustrates a skewed distribution with a mean of 4.27 (out of 5). The median and mode were 4 and 5 respectively (out of 5).

**Figure 7.13: The Impacts of Seaports' Greater OP, as a Result of Higher OE, on National Development (N=180)**



As can be seen from Figure 7.13 and Table 7.37, PSO managers of different branches, ranks, and educational levels greatly believed (86.6 per cent) that greater OP of seaports, as a result of higher OE of their organisations, would have positive impacts on national development in general, while only 10.0 per cent of managers were uncertain and 3.3 per cent were against the proposal.

Both Chi-square and Kolmogorov-Smirnov one-sample tests revealed significant differences between different frequencies of response categories to this variable. The Chi-square value of 167.778 and Kolmogorov-Smirnov Z value of 3.489 were both significant at .000 ( $p < 0.05$ ).

**Table 7.37: PSO Managers’ Responses to Impacts of Seaports’ Greater OP, as a Result of Higher OE, on National Development**

		Frequency	Percent (%)
Impacts of Seaports’ Greater OP, as a Result of Higher OE, on National Development	Strongly Agree	80	44.4
	Agree	76	42.2
	Neutral	18	10.0
	Disagree	4	2.2
	Strongly Disagree	2	1.1
Total		180	100.0

When the ‘Impacts of Greater OP, as a Result of Higher OE, on National Development’ item was evaluated by organisation location (Table 7.38), a comparatively lower percentage of B. Abbas managers (74.4 per cent) supported the proposal, while multitude of managers of all other branches were significantly in favour of the variable (H.Q. 95.2, B.I.K. 88.8, Bushehr 93.8, Anzali 90.9, Noshahr 88.2, and Chabahar 88.0 per cent).

A Chi-square test did not reveal significant differences between the impacts of greater OP on national development variable in various PSO branches (value of 27.766 was significant at .270 [ $p>0.05$ ]), nor did a Kruskal-Wallis test (Chi-square value of 8.837 was significant at .183 [ $p>0.05$ ], with 6 degrees of freedom). Even when seven PSO branches were aggregated into North and South branches, Mann-Whitney and Kolmogorov-Smirnov tests also failed to find significant differences between them (Z values of -.893 and .474 were significant at .372 and .978 [ $p>0.05$ ] respectively).

**Table 7.38: Overall Responses to Impacts of Seaports' Greater OP, as a Result of Higher OE, on National Development by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Impacts of Seaports' Greater OP, as a Result of Higher OE, on National Development	SA	No.	5	15	16	9	13	10	12	80
		%**	23.8	34.9	44.4	56.3	59.1	58.8	48.0	44.4
		%***	2.8	8.3	8.9	5.0	7.2	5.6	6.7	44.4
	A	No.	15	17	16	6	7	5	10	76
		%	71.4	39.5	44.4	37.5	31.8	29.4	40.0	42.2
		%	8.3	9.4	8.9	3.3	3.9	2.8	5.6	42.2
	N	No.	1	9	2		2	2	2	18
		%	4.8	20.9	5.6	0	9.1	11.8	8.0	10.0
		%	0.6	5.0	1.1		1.1	1.1	1.1	10.0
	D	No.		1	2	1				4
		%	0	2.3	5.6	6.3	0	0	0	2.2
		%		0.6	1.1	0.6				2.2
	SD	No.		1					1	2
		%	0	2.3	0	0	0	0	4.0	1.1
		%		0.6					0.6	1.1
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*0=Within Branch

\*\*\*0%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Evaluation of the variable in question with PSO's managerial titles (Table 7.39) revealed that, of the 120 managers who stated their position titles, a very high percentage (91.7 per cent of the total) of all managers of different positions almost equally agreed with the proposal (top managers 92.3 per cent, middle managers 87.8 per cent, department heads 93.5 per cent, and first line managers 92.9 per cent). This lack of difference between the two variables was also emphasised by Chi-square test of relatedness/independence (value of 12.160 was significant at .433 [ $p>0.05$ ]) and Kruskal-Wallis test (Chi-square value of 5.175 was significant at .159 [ $p>0.05$ ]). Even when four managerial titles were aggregated into Senior and Junior titles, Mann-Whitney test (Z value of -1.568 was significant at .117 [ $p>0.05$ ]) and Kolmogorov-Smirnov test (Z value of 1.011 was significant at .259 [ $p>0.05$ ]) failed to reveal significant differences between the variables.

**Table 7.39: Overall Responses to Impacts of Seaports' Greater OP, as a Result of Higher OE, on National Development by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Impacts of Seaports' Greater OP, as a Result of Higher OE, on National Development	SA	No.	14	17	18	10	59
		%**	50.0	37.0	54.5	76.9	49.2
		%***	11.7	14.2	15.0	8.3	49.2
	A	No.	12	26	11	2	51
		%	42.9	56.5	33.3	15.4	42.5
		%	10.0	21.7	9.2	1.7	42.5
	N	No.	1	2	2	1	6
		%	3.6	4.3	6.1	7.7	5.0
		%	0.8	1.7	1.7	0.8	5.0
	D	No.	1	0	1	0	2
		%	3.6	0	3.0	0	1.7
		%	0.8	0	0.8	0	1.7
	SD	No.	0	1	1	0	2
		%	0	2.2	3.0	0	1.7
		%	0	0.8	0.8	0	1.7
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*%=Within Position Title

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the responses to the proposal of the impacts of Greater OP on national development was assessed by managers' educational levels (Table 7.40), all PSO managers of different educational levels were almost equally supportive of the variable (Masters 87.3 per cent and Bachelors 86.4 per cent).

As expected, the Chi-square, Mann-Whitney, and Kolmogorov-Smirnov tests all failed to reveal significant differences between the above-mentioned variables. The Chi-square value of 1.239 was significant at .872 ( $p>0.05$ ), with 4 degrees of freedom. The Mann-Whitney Z value of -.503 was significant at .615 ( $p>0.05$ ). The Kolmogorov-Smirnov Z value of .252 was significant at 1.000 ( $p>0.05$ ).



**Table 7.40: Overall Responses to Impacts of Seaports' Greater OP, as a Result of Higher OE, on National Development by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Impacts of Seaports' Greater OP, as a Result of Higher OE, on National Development	SA	No.	26	54	80
		%*	47.3	43.2	44.4
		%**	14.4	30.0	44.4
	A	No.	22	54	76
		%	40.0	43.2	42.2
		%	12.2	30.0	42.2
	N	No.	6	12	18
		%	10.9	9.6	10.0
		%	3.3	6.7	10.0
	D	No.	1	3	4
		%	1.8	2.4	2.2
		%	0.6	1.7	2.2
SD	No.		2	2	
	%	0	1.6	1.1	
	%		1.1	1.1	
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

### 5.2.1. Summary

This section analysed the data related to 'Impacts of Greater OP, as a Result of Higher OE, on National Development' variable. The variable was self assessed and measured using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'.

There were significant statistical differences between frequencies of response categories of this variable, with the majority of PSO managers regardless of their branches, managerial positions, and educational levels believing that the greater OP of seaports, as a result of higher effectiveness of their organisations, would have positive impacts on development in general.

Managers of all PSO branches were in favour of the proposal, but managers of B. Abbas branch stood slightly lower than managers in other branches in supporting the proposal, however this difference was not statistically significant.

There were also no statistical significant differences between the variable in question and PSO managers' position titles and educational levels. That is, the variable was also independent of any particular managerial position and education level, and was treated equally by managers of all ranks and education levels.

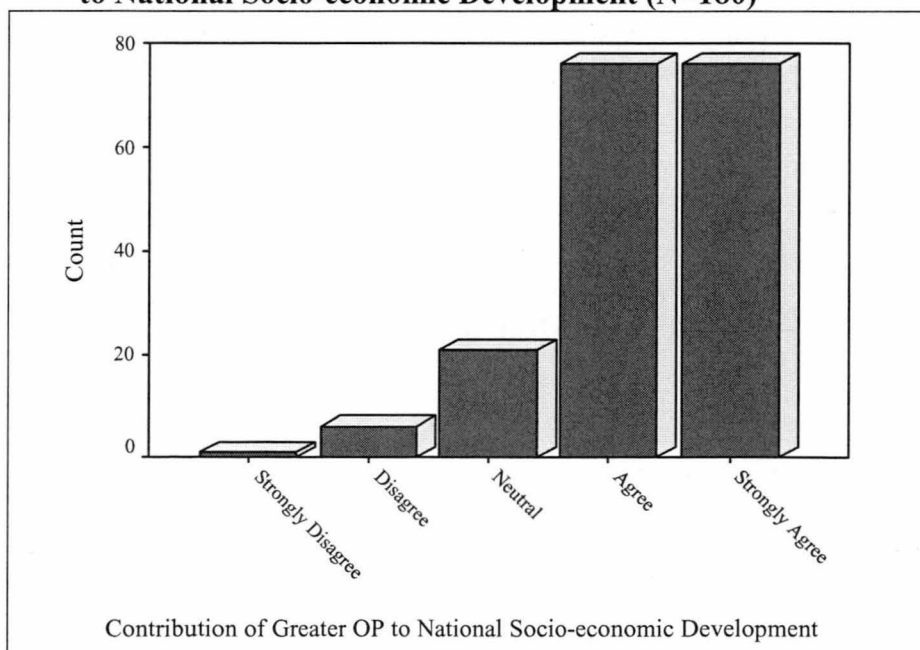
The next section will examine the contribution of seaports' greater OP, as a result of higher OE of their organisations, to national socio-economic development.

### 5.3. Contribution of Greater OP, as a Result of Higher OE, to National Socio-economic Development

The item 'Contribution of Greater OP, as a Result of Higher OE, to National Socio-economic Development' was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.14) shows a skewed distribution with a mean of 4.22 (out of 5). The median and mode were both 4 (out of 5).

**Figure 7.14: The Contribution of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development (N=180)**



As can be noted from Figure 7.14 and Table 7.41, a multitude of PSO managers (152 or 84.4 per cent) believed that greater OP of seaports, as a result of higher OE of their organisations, would positively contribute to national socio-economic development, while only a minority of 3.9 per cent were against and 11.7 per cent were undecided on the issue.

The one-sample Chi-square and Kolmogorov-Smirnov one-sample test found significant differences between different frequencies of response categories of the 'Contribution of Greater OP, as a Result of Higher OE, to National Socio-economic Development' variable. The Chi-square value of 154.167, with 4 degrees of freedom, and Kolmogorov-Smirnov Z value of 3.355 were both significant at .000 ( $p < 0.05$ ).

**Table 7.41: PSO Managers' Responses to Contribution of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development**

		Frequency	Percent (%)
<b>Contribution of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development</b>	<b>Strongly Agree</b>	76	42.2
	<b>Agree</b>	76	42.2
	<b>Neutral</b>	21	11.7
	<b>Disagree</b>	6	3.3
	<b>Strongly Disagree</b>	1	0.6
<b>Total</b>		180	100.0

When the above variable was evaluated by organisation location (Table 7.42), again managers in B. Abbas showed a relatively lower support (74.4 per cent), whereas the support of managers in all other branches ranged from 81.0 to 100.0 per cent (i.e. Bushehr 100.0, Noshahr 94.2, Chabahar 88.0, Anzali 86.3, B.I.K. 83.4, and H.Q. 81.0 per cent). This is not to say that the remaining managers of B. Abbas disagreed with the proposal, but that they were mainly uncertain on the issue (18.6 per cent).

A Chi-square test did not reveal significant differences between variable's frequencies of response categories across various PSO branches (significant .887 [ $p > 0.05$ ]), nor did a Kruskal-Wallis test (Chi-square value of 9.147, with 6 degrees of freedom, was significant at .165 [ $p > 0.05$ ]). Mann-Whitney and Kolmogorov-Smirnov tests also failed

to reveal significant differences with aggregation at North and South branches (at .658 and 1.000 levels of significance [ $p>0.05$ ] respectively).

**Table 7.42: Overall Responses to Contribution of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Contribution of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development	SA	No.	6	15	15	10	12	8	10	76
		%**	28.6	34.9	41.7	62.5	54.5	47.1	40.0	42.2
		%***	3.3	8.3	8.3	5.6	6.7	4.4	5.6	42.2
	A	No.	11	17	15	6	7	8	12	76
		%	52.4	39.5	41.7	37.5	31.8	47.1	48.0	42.2
		%	6.1	9.4	8.3	3.3	3.9	4.4	6.7	42.2
	N	No.	3	8	4		3	1	2	21
		%	14.3	18.6	11.1	0	13.6	5.9	8.0	11.7
		%	1.7	4.4	2.2		1.7	0.6	1.1	11.7
	D	No.	1	2	2				1	6
		%	4.8	4.7	5.6	0	0	0	4.0	3.3
		%	0.6	1.1	1.1				0.6	3.3
	SD	No.		1						1
		%	0	2.3	0	0	0	0	0	0.6
		%		0.6						0.6
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*%=Within Branch

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Assessment of the 'Contribution of Greater OP, as a Result of Higher OE, to National Socio-economic Development' variable by managers' position titles (Table 7.43) revealed that all top managers (100.0 per cent) were in favour of the proposal followed by 91.3 per cent of department heads, 87.9 per cent of middle managers, and 85.7 per cent of first line managers.

Chi-square and Kruskal-Wallis tests did not reveal significant differences between this variable and different managerial position titles (values of 6.404 and 1.045 were significant at .894 and .790 [ $p>0.05$ ] respectively). The aggregation of four position titles into two (Senior and Junior) also did not help Mann-Whitney and Kolmogorov-

Smirnov tests to reveal any significant differences between the variables (Z values of –.284 and .232 were significant at .776 and 1.000 [ $p>0.05$ ] respectively).

**Table 7.43: Overall Responses to Contributions of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Contributions of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development	SA	No.	15	22	14	7	58
		%**	53.6	47.8	42.4	53.8	48.3
		%***	12.5	18.3	11.7	5.8	48.3
	A	No.	9	20	15	6	50
		%	32.1	43.5	45.5	46.2	41.7
		%	7.5	16.7	12.5	5.0	41.7
	N	No.	3	3	3		9
		%	10.7	6.5	9.1	0	7.5
		%	2.5	2.5	2.5		7.5
	D	No.	1		1		2
		%	3.6	0	3.0	0	1.7
		%	0.8		0.8		1.7
	SD	No.		1			1
		%	0	2.2	0	0	0.8
		%		0.8			0.8
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*%=Within Position Title

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Evaluation of the "Contribution of Greater OP to National Socio-economic Development" variable by managers' education levels (Table 7.44) indicated an almost evenly spread of managers' educational levels in supporting the proposal (83.6 per cent of Masters and 84.8 per cent of Bachelors). Chi-square, Mann-Whitney, and Kolmogorov-Smirnov tests also endorsed this lack of difference (significant at .817, .941, and 1.000 [ $p>0.05$ ] respectively).

**Table 7.44: Overall Responses to Contributions of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master	Bachelor	
			(N=55)	(N=125)	
Contributions of Seaports' Greater OP, as a Result of Higher OE, to National Socio-economic Development	SA	No.	23	53	76
		%*	41.8	42.4	42.2
		%**	12.8	29.4	42.2
	A	No.	23	53	76
		%	41.8	42.4	42.2
		%	12.8	29.4	42.2
	N	No.	8	13	21
		%	14.5	10.4	11.7
		%	4.4	7.2	11.7
	D	No.	1	5	6
		%	1.8	4.0	3.3
		%	0.6	2.8	3.3
	SD	No.	1	1	2
		%	0	0.8	0.6
		%	0	0.6	0.6
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

### 5.3.1. Summary

This section examined the 'Contribution of Greater OP, as a Result of Higher OE, to National Socio-economic Development' variable. The variable was self assessed and measured using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'.

There were significant statistical differences between frequencies of response categories of this variable, with the multitude of PSO managers regardless of their branches, managerial positions, and educational levels believed that the greater OP of seaports, as a result of higher effectiveness of their organisations, would positively contribute to national socio-economic development.

This section also found that managers in Bushehr indicated their maximum support for the proposal, while B. Abbas managers scored the minimum and managers in other five

branches laid between these two ports (ranging from 81.0 to 94.2 per cent). However, these differences were not statistically significant.

Although not statistically significant, this section revealed that 100.0 per cent of top managers and about 88.0 per cent of middle managers were in favour of the proposal, a difference that may have been caused by senior managers' involvements in organisational planning. Again, these differences were not statistically significant.

There were not also any significant differences between the variable in question and the PSO managers' educational levels and managers of all educational levels were almost equally supportive of the proposal. That is, this variable was not related to any particular managerial educational level.

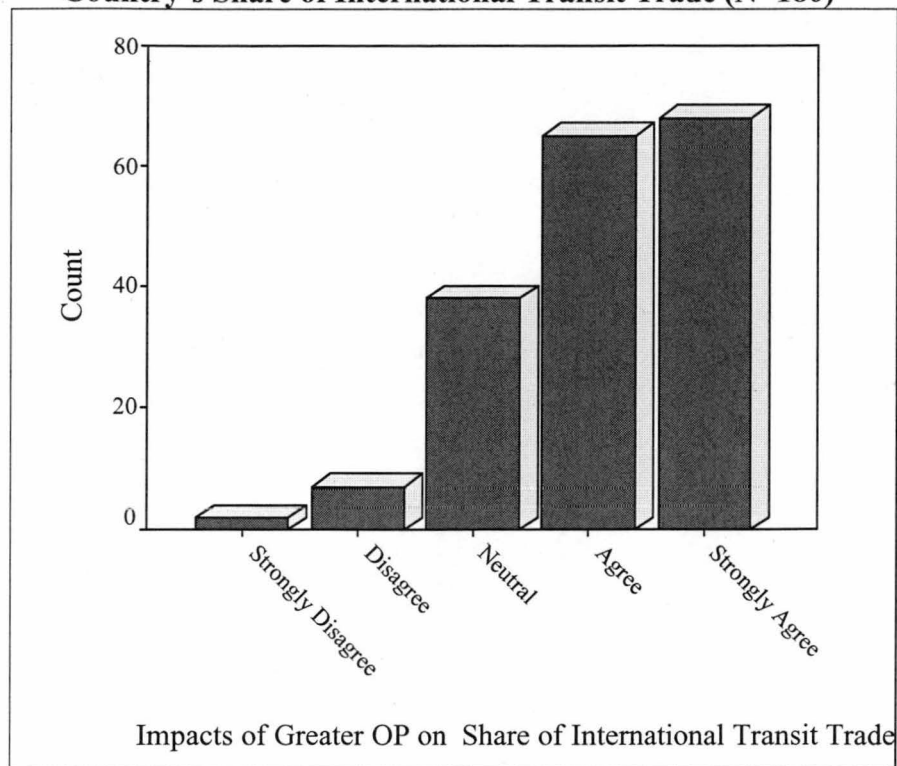
The next section will discuss the impacts of greater OP of seaports, as a result of higher OE of their organisations, on country's share of international transit trade.

#### **5.4. The Impacts of Greater OP, as a Result of Higher OE, on Country's Share of International Transport**

The 'Impacts of Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade' variable was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.15) illustrates a skewed distribution with a mean of 4.06 (out of 5). The median and mode were 4 and 5 respectively (out of 5).

**Figure 7.15: The Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade (N=180)**



As can be seen from Figure 7.15 and Table 7.45, about 74 per cent of PSO managers (or 133 managers) believed that greater OP of seaports, as a result of higher effectiveness of their organisations, would help the country to achieve a higher share of international transit trade, while 22 per cent of managers were undecided on this issue and only 5 per cent of them disagreed with the issue.

Kolmogorov-Smirnov one sample test and one sample Chi-square test revealed significant differences between different frequencies of response categories to this variable. The Kolmogorov-Smirnov Z value of 3.026 and the Chi-square value of 107.389, with 4 degrees of freedom, were both significant at .000 ( $p < 0.05$ ).



**Table 7.45: PSO Managers' Responses to Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade**

		Frequency	Percent (%)
<b>Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade</b>	<b>Strongly Agree</b>	68	37.8
	<b>Agree</b>	65	36.1
	<b>Neutral</b>	38	21.1
	<b>Disagree</b>	7	3.9
	<b>Strongly Disagree</b>	2	1.1
<b>Total</b>		180	100.0

When the frequency of responses to the 'Impacts of Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade' variable was evaluated by organisation location (Table 7.46), a high percentage of managers in B.I.K., Noshahr, and Chabahar branches supported the proposal (91.7, 88.2, and 80.0 per cent respectively). The downtrend of support was followed by B. Abbas (72.1 per cent), Anzali (68.2 per cent), and Bushehr (56.3 per cent). Finally, for the first time in this research, a percentage of less than 50 per cent, in supporting a variable, was recorded by managers in H.Q. (47.6 per cent). However, out of 52.4 per cent of remaining H.Q.'s managers, about 43 per cent indicated a neutral attitude towards the issue.

A Chi-square test of relatedness/independence and Kruskal-Wallis test revealed the existence of significant differences between variable's different frequencies of response categories in various PSO branches. The Chi-square value of 43.394 was significant at .009 ( $p < 0.05$ ), but more than 20 per cent of the cells had an expected count of less than 5 making the chi-square figure suspect. The Kruskal-Wallis test showed that significant differences existed between the two variables, differences that were significant at .007 ( $p < 0.05$ ) (Chi-square value of 17.751, with 6 degrees of freedom).

**Table 7.46: Overall Responses to Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade	SA	No.	2	13	14	6	9	10	14	68
		%**	9.5	30.2	38.9	37.5	40.9	58.8	56.0	37.8
		%***	1.1	7.2	7.8	3.3	5.0	5.6	7.8	37.8
	A	No.	8	18	19	3	6	5	6	65
		%	38.1	41.9	52.8	18.8	27.3	29.4	24.0	36.1
		%	4.4	10.0	10.6	1.7	3.3	2.8	3.3	36.1
	N	No.	9	10		7	7	1	4	38
		%	42.9	23.3	0	43.8	31.8	5.9	16.0	21.1
		%	5.0	5.6		3.9	3.9	0.6	2.2	21.1
	D	No.	1	1	3			1	1	7
		%	4.8	2.3	8.3	0	0	5.9	4.0	3.9
		%	0.6	0.6	1.7			0.6	0.6	3.9
	SD	No.	1	1						2
		%	4.8	2.3	0	0	0	0	0	1.1
		%	0.6	0.6						1.1
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*%=Within Branch

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the variable in question was assessed by PSO managers' position titles, of the 120 managers who declared their position titles (Table 7.47), middle managers, department heads, and first line managers were about equally supportive of the proposal (78.8, 78.3, and 78.6 per cent respectively), while top managers indicated a relatively lower support for the issue (61.6 per cent).

Kruskal-Wallis and Chi-square tests did not find significant differences between the variable and different position titles (Chi-square values of .836 and 15.488 were significant at .841 and .218 [ $p>0.05$ ] respectively). The aggregation of four position titles into two (Senior and Junior) also did not help Mann-Whitney and Kolmogorov-Smirnov tests to reveal any significant differences between the variables (Z values of -.391 and .372 were significant at .696 and .999 [ $p>0.05$ ] respectively).

**Table 7.47: Overall Responses to Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade	SA	No.	11	16	15	5	47
		%**	39.3	34.8	45.5	38.5	39.2
		%***	9.2	13.3	12.5	4.2	39.2
	A	No.	11	20	11	3	45
		%	39.3	43.5	33.3	23.1	37.5
		%	9.2	16.7	9.2	2.5	37.5
	N	No.	3	8	6	5	22
		%	10.7	17.4	18.2	38.5	18.3
		%	2.5	6.7	5.0	4.2	18.3
	D	No.	3		1		4
		%	10.7	0	3.0	0	3.3
		%	2.5		0.8		3.3
	SD	No.		2			2
		%	0	4.3	0	0	1.7
		%		1.7			1.7
Total		No.	28	46	33	13	120
		%	100.0	100.0	100.0	100.0	100.0
		%	23.3	38.3	27.5	10.8	100.0

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*%=Within Position Title

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Evaluation of the 'Impacts of Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade' variable by managers' education levels (Table 7.48) revealed that there were no extreme differences between managers with a Master degree and those with a Bachelor degree (65.5 and 77.6 per cent respectively), however about one-third of managers possessing a Master degree were undecided on the issue (30.9 per cent) as compared to those with a Bachelor degree (16.8 per cent).

The Chi-square, Mann-Whitney, and Kolmogorov-Smirnov tests all failed to reveal significant differences between the above-mentioned variables. The Chi-square value of 6.415 was significant at .170 ( $p > 0.05$ ), with 4 degrees of freedom. The Mann-Whitney Z value of -1.783 was significant at .075 ( $p > 0.05$ ). The Kolmogorov-Smirnov Z value of .773 was significant at .588 ( $p > 0.05$ ).

**Table 7.48: Overall Responses to Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Impacts of Seaports' Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade	SA	No.	16	52	68
		%*	29.1	41.6	37.8
		%**	8.9	28.9	37.8
	A	No.	20	45	65
		%	36.4	36.0	36.1
		%	11.1	25.0	36.1
	N	No.	17	21	38
		%	30.9	16.8	21.1
		%	9.4	11.7	21.1
	D	No.	1	6	7
		%	1.8	4.8	3.9
		%	0.6	3.3	3.9
	SD	No.	1	1	2
		%	1.8	0.8	1.1
		%	0.6	0.6	1.1
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education

\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

### 5.4.1. Summary

This section analysed PSO managers' responses to 'Impacts of Greater OP, as a Result of Higher OE, on Country's Share of International Transit Trade' variable. The variable was self assessed and measured using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'.

There were statistical significant differences between different frequencies of response categories of this variable, with the majority of PSO managers regardless of their branches, managerial positions, and educational levels believed that greater operational performance of seaports, as a result of higher OE of their organisations, would help the country to achieve a higher share of international transit trade.

There were also statistically significant differences between frequencies of responses to Impacts of Greater OP, as a Result of Higher OE, on Country's Share of International

Transit Trade' variable when assessed by organisation location. Managers in B.I.K., Noshahr, and Chabahar tended to be more in favour of the proposal than those in other branches. Further, only less than 50 per cent of managers in H.Q. supported the proposal. These differences may have been affected by the confusion over the actual role of port organisations in transit industry.

This section also found that top managers were slightly less in favour of the proposal as compared to middle managers, department heads, and first line managers. However, this difference was not statistically significant (i.e. the variable was not related to any particular managerial position title).

Finally, there were no statistical significant differences between the variable and managers' educational levels. That is, this variable was independent of any specific education level.

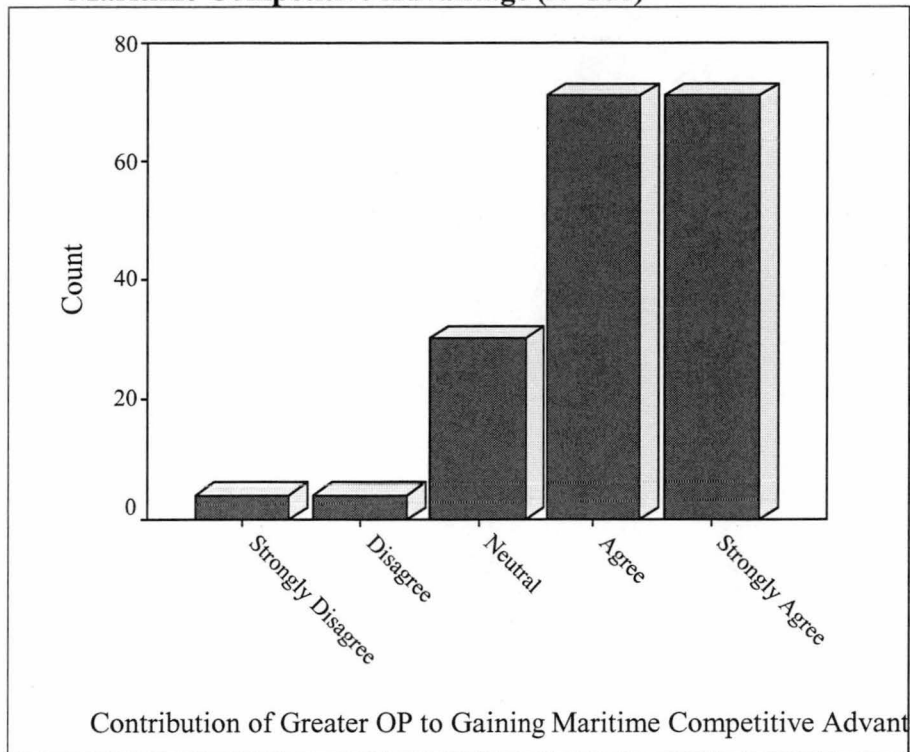
The next section will examine the contribution of greater seaports' OP, as a result of their organisations' higher OE, to gaining maritime competitive advantage.

### **5.5. Contribution of Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage**

The variable 'Contribution of Greater OP, as a result of Higher OE, to Gaining a Maritime Competitive Advantage' was measured using a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. All results and tables using this item were constructed from answers to the related question(s) in the survey instrument.

The histogram below (Figure 7.16) illustrates a skewed distribution with a mean of 4.12 (out of 5). The median and mode were both 4 (out of 5).

**Figure 7.16: Contribution of Greater OP, as a result of Higher OE, to Gaining a Maritime Competitive Advantage (N=180)**



As can be seen from Figure 7.16 and Table 7.49, a great majority of managers (78.8 per cent, or 142 managers) regardless of their locations, ranks, and educational levels considered that greater OP of seaports, as a result of higher effectiveness of their organisations, would help the country to gain a maritime competitive advantage in the region (mainly among Gulf countries), while only 16.7 per cent of managers were undecided and less than 5 per cent disagreed on the issue.

Both Chi-square and Kolmogorov-Smirnov one-sample tests found significant differences between different frequencies of response categories to this variable. The Chi-square value of 125.944, with 4 degrees of freedom, and Kolmogorov-Smirnov Z value of 3.197 were both significant at .000 ( $p < 0.05$ ).

**Table 7.49: PSO Managers' Responses to Contribution of Seaports' Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage**

		Frequency	Percent (%)
<b>Contribution of Seaports' Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage</b>	<b>Strongly Agree</b>	71	39.4
	<b>Agree</b>	71	39.4
	<b>Neutral</b>	30	16.7
	<b>Disagree</b>	4	2.2
	<b>Strongly Disagree</b>	4	2.2
<b>Total</b>		180	100.0

When this variable was assessed by organisation location (Table 7.50), managers of all branches showed almost equal positive responses towards the issue, ranging from 78 to 88 per cent, except managers in H.Q. who indicated a comparatively lower support (66.6 per cent) for the proposal (about 24 per cent of the remaining H.Q.'s managers were undecided).

Neither the Chi-square and Kruskal-Wallis tests nor Mann-Whitney and Kolmogorov-Smirnov tests (after aggregation of seven PSO branches into North and South branches) revealed any significant differences between variable's frequencies of responses across various PSO branches. The Chi-square value of 31.351 was significant at .144 ( $p>0.05$ ), Kruskal-Wallis's Chi-square value of 10.945, with 6 degrees of freedom, was significant at .090 ( $p>0.05$ ), Mann-Whitney Z value of -.739 was significant at .460 ( $p>0.05$ ), and Kolmogorov-Smirnov Z value of .422 was significant at .994 ( $p>0.05$ ).

**Table 7.50: Overall Responses to Contribution of Seaports' Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage by Organisation Location (Managers [N=180], Locations [N=7])**

			PSO Branches							Total
			1* (N=21)	2 (N=43)	3 (N=36)	4 (N=16)	5 (N=22)	6 (N=17)	7 (N=25)	
Contribution of Seaports' Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage	SA	No.	2	16	13	8	9	10	13	71
		%**	9.5	37.2	36.1	50.0	40.9	58.8	52.0	39.4
		%***	1.1	8.9	7.2	4.4	5.0	5.6	7.2	39.4
	A	No.	12	18	15	5	9	5	7	71
		%	57.1	41.9	41.7	31.3	40.9	29.4	28.0	39.4
		%	6.7	10.0	8.3	2.8	5.0	2.8	3.9	39.4
	N	No.	5	7	8	2	4		4	30
		%	23.8	16.3	22.2	12.5	18.2	0	16.0	16.7
		%	2.8	3.9	4.4	1.1	2.2		2.2	16.7
	D	No.	1			1		2		4
		%	4.8	0	0	6.3	0	11.8	0	2.2
		%	0.6			0.6		1.1		2.2
	SD	No.	1	2					1	4
		%	4.8	4.7	0	0	0	0	4.0	2.2
		%	0.6	1.1					0.6	2.2
Total		No.	21	43	36	16	22	17	25	180
		%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		%	11.7	23.9	20.0	8.9	12.2	9.4	13.9	100.0

\*1=PSO Headquarters

2=B. Abbas Branch

3=B.I.K Branch

4=Bushehr Branch

5=Anzali Branch

6=Noshahr Branch

7=Chabahar Branch

\*\*%=Within Branch

\*\*\*%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

Comparison of the variable in question with PSO managers' position titles (Table 7.51) revealed that managers of different ranks were almost equally supportive of the proposal (i.e. top managers 77.0, middle managers 81.9, department heads 82.6, and first line managers 75.0 per cent). This lack of difference between the two variables was also emphasised by Chi-square test of relatedness/independence (value of 7.704 was significant at .808 [ $p>0.05$ ]) and Kruskal-Wallis test (Chi-square value of .581 was significant at .901 [ $p>0.05$ ]). Even when four managerial titles were aggregated into Senior and Junior titles, Mann-Whitney test (Z value of  $-0.606$  was significant at .545 [ $p>0.05$ ]) and Kolmogorov-Smirnov test (Z value of .344 was significant at 1.000 [ $p>0.05$ ]) failed to reveal significant differences between the variables.



**Table 7.51: Overall Responses to Contribution of Seaports' Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage by Managers' Position Titles (Managers [N=120], Titles [N=4])**

			Position Title				Total
			1* (N=28)	2 (N=46)	3 (N=33)	4 (N=13)	
Contribution of Seaports' Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage	SA	No.	13	16	15	6	50
		%**	46.4	34.8	45.5	46.2	41.7
		%***	10.8	13.3	12.5	5.0	41.7
	A	No.	8	22	12	4	46
		%	28.6	47.8	36.4	30.8	38.3
		%	6.7	18.3	10.0	3.3	38.3
	N	No.	6	5	5	3	19
		%	21.4	10.9	15.2	23.1	15.8
		%	5.0	4.2	4.2	2.5	15.8
	D	No.	1	1		0	2
		%	3.6	2.2	0	0	1.7
		%	0.8	0.8			1.7
	SD	No.		2	1		3
		%	0	4.3	3.0	0	2.5
		%		1.7	0.8		2.5
Total	No.	28	46	33	13	120	
	%	100.0	100.0	100.0	100.0	100.0	
	%	23.3	38.3	27.5	10.8	100.0	

\*1=1<sup>st</sup> Line Managers

2=Department Heads

3=Middle Managers

4=Top Managers

\*\*0%=Within Position Title

\*\*\*0%=of the Total

SA=Strongly Agree

A=Agree

N=Neutral

D=Disagree

SD=Strongly Disagree

When the 'Contribution of Greater OP, as a result of Higher OE, to Gaining a Maritime Competitive Advantage' variable was evaluated by PSO managers education levels (Table 7.52), not much differences were found between managers' (with different educational categories) attitudes in supporting the issue (Masters 76.3 per cent and Bachelors 80.0 per cent). This lack of difference was also confirmed by a Chi-square test of relatedness, a Mann-Whitney test, and Kolmogorov-Smirnov test (all these tests showed a *p*-value of greater than 0.05).

**Table 7.52: Overall Responses to Contribution of Seaports' Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage by Managers' Education (Managers [N=180], Educational Levels [N=2])**

			Managers' Education		Total
			Master (N=55)	Bachelor (N=125)	
Contribution of Seaports' Greater OP, as a Result of Higher OE, to Gaining a Maritime Competitive Advantage	SA	No.	18	53	71
		%*	32.7	42.4	39.4
		%**	10.0	29.4	39.4
	A	No.	24	47	71
		%	43.6	37.6	39.4
		%	13.3	26.1	39.4
	N	No.	12	18	30
		%	21.8	14.4	16.7
		%	6.7	10.0	16.7
	D	No.		4	4
		%	0	3.2	2.2
		%		2.2	2.2
SD	No.	1	3	4	
	%	1.8	2.4	2.2	
	%	0.6	1.7	2.2	
Total		No.	55	125	180
		%	100.0	100.0	100.0
		%	30.6	69.4	100.0

\*%=Within Education  
 \*\*%=of the Total

SA=Strongly Agree  
 A=Agree  
 N=Neutral  
 D=Disagree  
 SD=Strongly Disagree

### 5.5.1. Summary

This section examined PSO managers' responses to 'Contribution of Greater OP, as a result of Higher OE, to Gaining a Maritime Competitive Advantage' variable. The variable was self assessed and measured using a 5-point Likert scale from 'Strongly Disagree' to 'Strongly Agree'.

There were statistical significant differences between different frequencies of response categories of this variable, with the multitude of PSO managers regardless of their branches, managerial positions, and educational levels believed that greater operational performance of seaports, as a result of higher OE of their organisations, would help the country to gain a maritime competitive advantage in the region (particularly among Gulf countries).

Although not statistically significant when 'Contribution of Greater OP, as a result of Higher OE, to Gaining a Maritime Competitive Advantage' variable was evaluated by organisation location, this section found that the variable in question was independent of the organisation location. In other words, majority of PSO managers, regardless of their organisation branch and size, had the same high support for the proposal, except managers in H.Q. who showed a relatively lower support for the proposal.

There were also no statistical significant differences between 'Contribution of Greater OP, as a result of Higher OE, to Gaining a Maritime Competitive Advantage' variable and PSO managers' position titles. That is, this proposal was not related to any particular position in the organisation and treated the same by managers of different ranks.

This section also did not find any statistical significant differences between 'Contribution of Greater OP, as a result of Higher OE, to Gaining a Maritime Competitive Advantage' variable and managers' education levels (i.e. the variable was independent of educational level).

## **5.6. Correlations between the Impacts of Greater Operational Performance of Seaports Variables**

As the data relating to five variables of seaports' operational performance have been previously described and shown to be fundamentally reliable and valid, this section and its sub-sections will discuss the relationship between the 'Greater OP of Seaports as a Result of Higher OE of Their Organisations' variable (treated as a pivot variable) and the other four variables. As previously described, all these variables were measured on a 5-point Likert scale. Due to the nature of the data (ordinal), correlations between these variables were carried out using an appropriate nonparametric correlation technique.

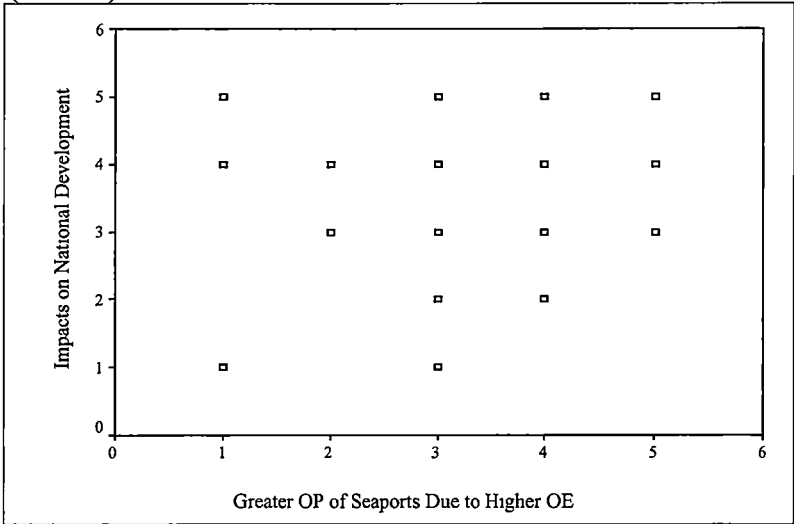
Of all the statistics on ordinal data, the Spearman rank-order correlation coefficient (Spearman's rho) was the earliest to be developed and is perhaps the best known today (Siegel & Castellan 1988). Therefore, the Spearman's rho correlation technique was found to be appropriate in measuring the degree of association between the variables. In addition to presenting measures of association, the Spearman's rho coefficient was used

to determine the significance of the observed associations (Phillips 1996), the results of which are shown in Appendix 11.

5.6.1. Greater OP, as a Result of Higher OE, and National Development

The scatterplot of the two variables is shown in Figure 7.17. The figure generally shows a positive slope correlation, reflecting Spearman’s rho correlation of .344 that was highly significant as indicated by the *p*-value (Appendix 11), at 99 per cent level of confidence (.000, *p*<0.01).

Figure 7.17: Greater OP, as a Result of Higher OE, and National Development (N=180)



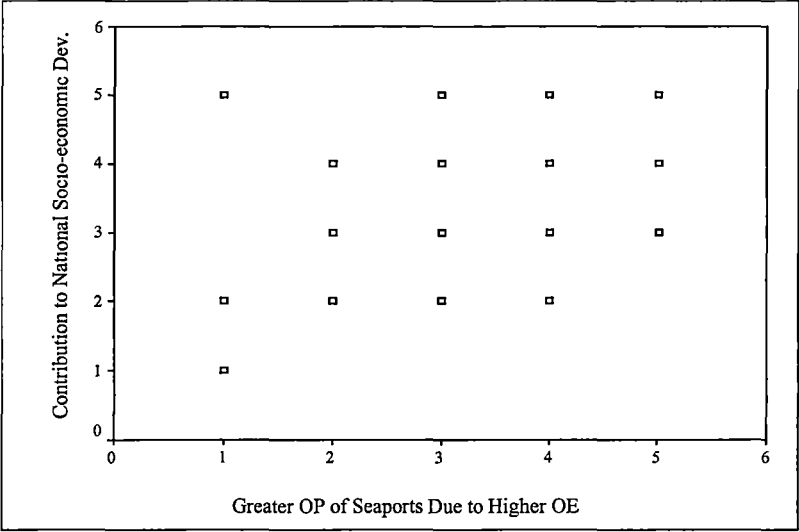
The result of Spearman’s rho correlation and its test of significance showed that the greater OP of seaports, as a result of higher OE of their organisations variable was associated and significantly differed with national development variable.

5.6.2. Greater OP, as a Result of Higher OE, and National Socio-economic Development

The scatterplot of the two variables is shown in Figure 7.18. The figure generally shows a positive slope correlation, reflecting Spearman’s rho correlation of .392 that was

highly significant as indicated by the *p*-value (Appendix 11), at 99 per cent level of confidence (.000, *p*<0.01).

**Figure 7.18: Greater OP, as a Result of Higher OE, and National Socio-economic Development (N=180)**

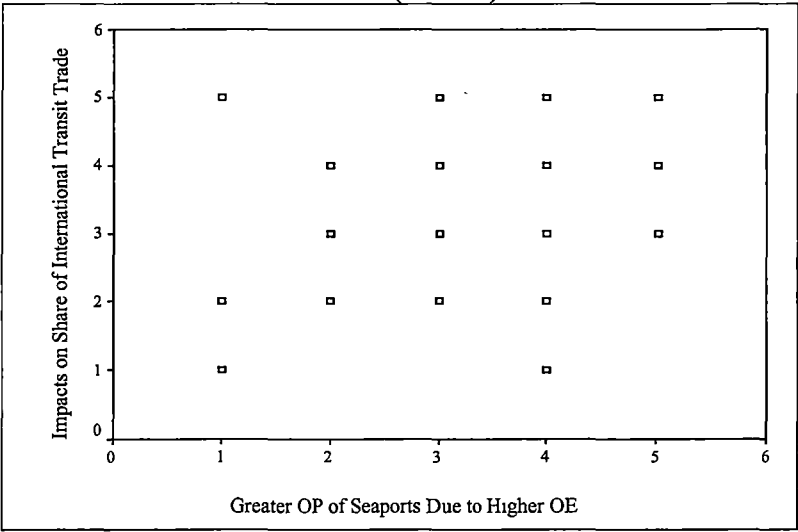


The result of Spearman’s rho correlation and its test of significance showed that the greater OP of seaports, as a result of higher OE of their organisations variable was associated and significantly differed with national socio-economic development variable.

**5.6.3. Greater OP, as a Result of Higher OE, and Country’s Share of International Transit Trade**

The scatterplot of the two variables is shown in Figure 7.19. The figure generally shows a positive slope correlation, reflecting Spearman’s rho correlation of .402 that was highly significant as indicated by the *p*-value (Appendix 11), at 99 per cent level of confidence (.000, *p*<0.01).

**Figure 7.19: Greater OP, as a Result of Higher OE, and Country’s Share of International Transit Trade (N=180)**

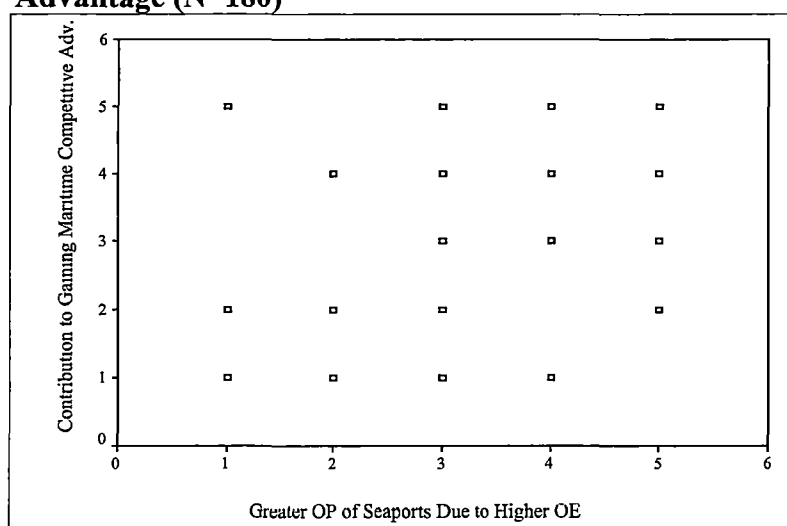


The result of Spearman’s rho correlation and its test of significance showed that the greater OP of seaports, as a result of higher OE of their organisations variable was associated and significantly differed with country’s share of international transit trade variable.

**5.6.4. Greater OP, as a Result of Higher OE, and Maritime Competitive Advantage**

The scatterplot of the two variables is shown in Figure 7.20. The figure generally shows a positive slope correlation, reflecting Spearman’s rho correlation of .238 that was highly significant as indicated by the *p*-value (Appendix 11), at 99 per cent level of confidence (.001, *p*<0.01).

**Figure 7.20: Greater OP, as a Result of Higher OE, and Maritime Competitive Advantage (N=180)**



The result of Spearman's rho correlation and its test of significance showed that the greater OP of seaports, as a result of higher OE of their organisations variable was associated and significantly differed with country's gaining a maritime competitive advantage.

### 5.6.5. Correlation Summary

This section examined the existence of possible correlation between different variables of impacts of seaports' greater OP as a result of higher OE of their organisations using scatterplots and Spearman's rho correlation coefficients.

There were high correlations and significant differences between the proposal of 'Greater OP as a Result of Higher OE' and the four resultant variables that can be summarised as follows:

- Greater seaports' OP, as a result of higher effectiveness of their organisations, will have positive impacts on national development in general;
- Greater seaports' OP, as a result of higher effectiveness of their organisations, will positively contribute to national socio-economic development in particular;
- Greater seaports' OP, as a result of higher effectiveness of their organisations, will assist the country to achieve a higher share of international transit trade; and

- Greater seaports' OP, as a result of higher effectiveness of their organisations, will assist the country to gain a maritime competitive advantage in the region (particularly among Gulf countries).

## 6. Summary

This chapter was confined to presentation and analysis of the collected data from the questionnaire survey as they related to the first and second research questions and hypotheses. The chapter presented and analysed the data in three ways. Firstly, measures of reliability and validity (Cronbach's alpha and principal component factor analysis) were used to test the reliability and validity of collected data. Secondly, descriptive statistics were utilised to get a feel for the data. Thirdly, appropriate statistical techniques were conducted to test the hypotheses.

The summary of each research question and hypothesis will be presented separately in the following subsections.

### 6.1. Summary of the First Research Question and Hypothesis

The first part of this chapter examined the results of the data as they related to the first research question and hypothesis:

- Q1.** Why should the effectiveness of a seaport organisation be assessed/measured regularly? What is the relationship between this assessment and organisation location, managers' ranks and managers' education levels?
- H1.** The result of regular assessment of OE can be used to improve seaport organisation's effectiveness, regardless of its location, managers' ranks and managers' education levels.

Six different variables associated with Regular Assessment of OE in seaport organisations were examined individually, prior to comparing each of them with organisation location, managerial position titles, and managers' education levels for



relatedness/independency (i.e. to find out that each variable was related to or independent of organisation location, managers' position title and education).

Finally, the existence of possible correlation between different variables of Regular OE Assessment was also examined using scatterplots and Spearman's rho correlation coefficients.

In individual statistical examination of each variable of regular OE assessment, this study found that there were high significant statistical differences between the frequencies of response categories of all six variables of regular OE assessment in port organisations. That is, all PSO managers:

- were largely in favour of regular OE assessment in port organisations;
- were about half undecided and half agreed and strongly agreed on the appropriateness of a system-based model for regular OE assessment;
- were greatly in favour of the proposal that regular assessment of OE would indicate the status of port organisations in terms of effectiveness;
- believed that the results of OE assessments on a regular basis could be used as a guide to enhance the effectiveness of port organisations in the future;
- reached a consensus that the results of regular OE assessments could be used as a guide for future strategic (long-term) planning of the port organisations; and
- were largely in favour of the issue that the results of regular OE assessment would indicate port organisation's strengths and weaknesses.

Further, there were significant statistical differences between overall 'Regular OE Assessment' responses when assessed by 'Periodical Assessment of OE' responses. The difference was predominantly between annual assessment of OE and all other periodical categories (biannual, biennial, and every 5 years) with managers of all ranks, locations, and educations rating the annual assessment of OE very high.

Statistically significant differences also existed between overall 'Appropriateness of a System-based OE Model' responses when assessed by 'Future Consideration of the Proposed OE Model' responses. The managers of all ranks, locations, and educations

agreed to consider the proposed model for assessing the effectiveness of their organisations in the future.

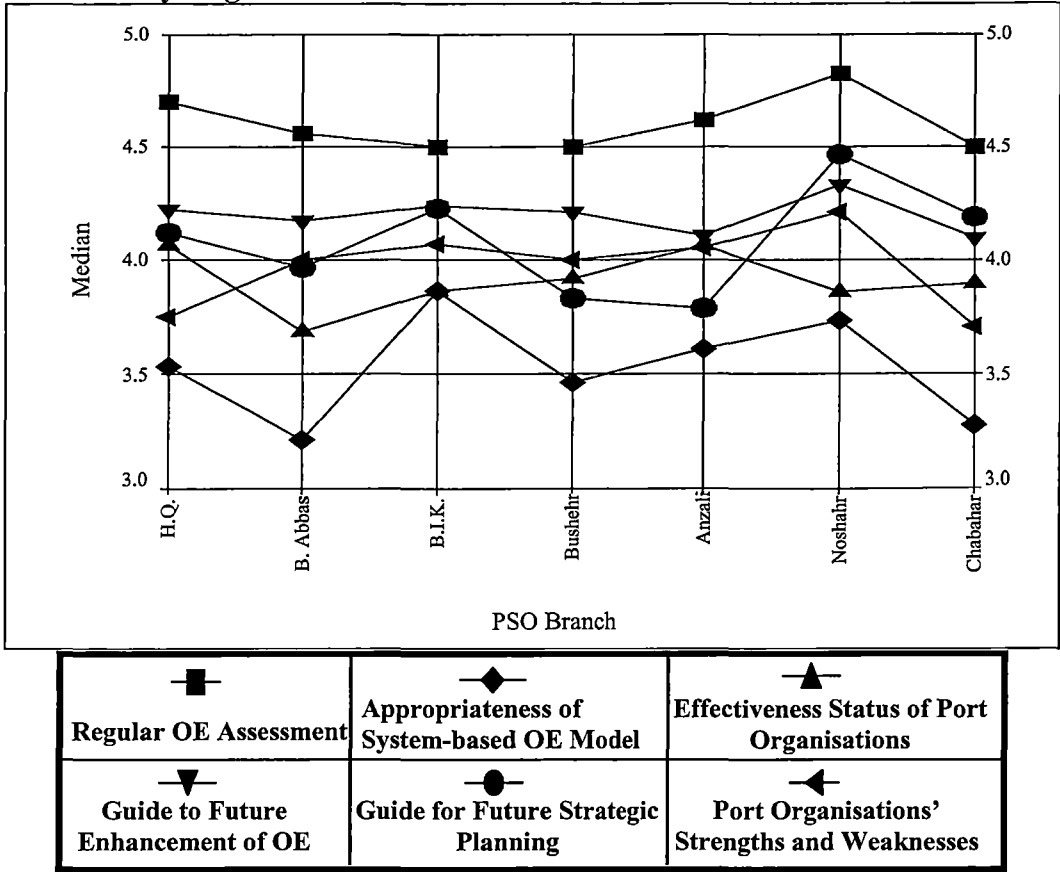
Overall evaluations of all regular OE assessment variables by organisation location are summarised in Figure 7.21. As can be noted, all variables had a relatively high median across all PSO branches, 'Regular OE Assessment' variable with median 5 being the highest and 'Appropriateness of a System-based OE Model' variable with average median 3.5 being the lowest, and all other variables with average median of 4 being in the middle of the spectrum<sup>18</sup>.

The statistical analysis of evaluating the six variables by organisation location showed that, except 'Appropriateness of a System-based OE Model' variable, the other five variables were not related to any particular PSO branch. That is, all statistical tests failed to reveal significant differences between the responses to five variables and organisation location. Therefore, the results obtained from these five variables were totally independent of organisation location. However, there were marginal statistical significant differences between 'Appropriateness of a System-based OE Model' variable when assessed by organisation location, indicating the dependency of this variable to organisation location. Managers in H.Q., B.I.K., and Noshahr tended to be more in favour of the model, whereas managers in other branches largely indicated a neutral attitude towards the model.

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<sup>18</sup> Note: all denoted medians are out of 5.

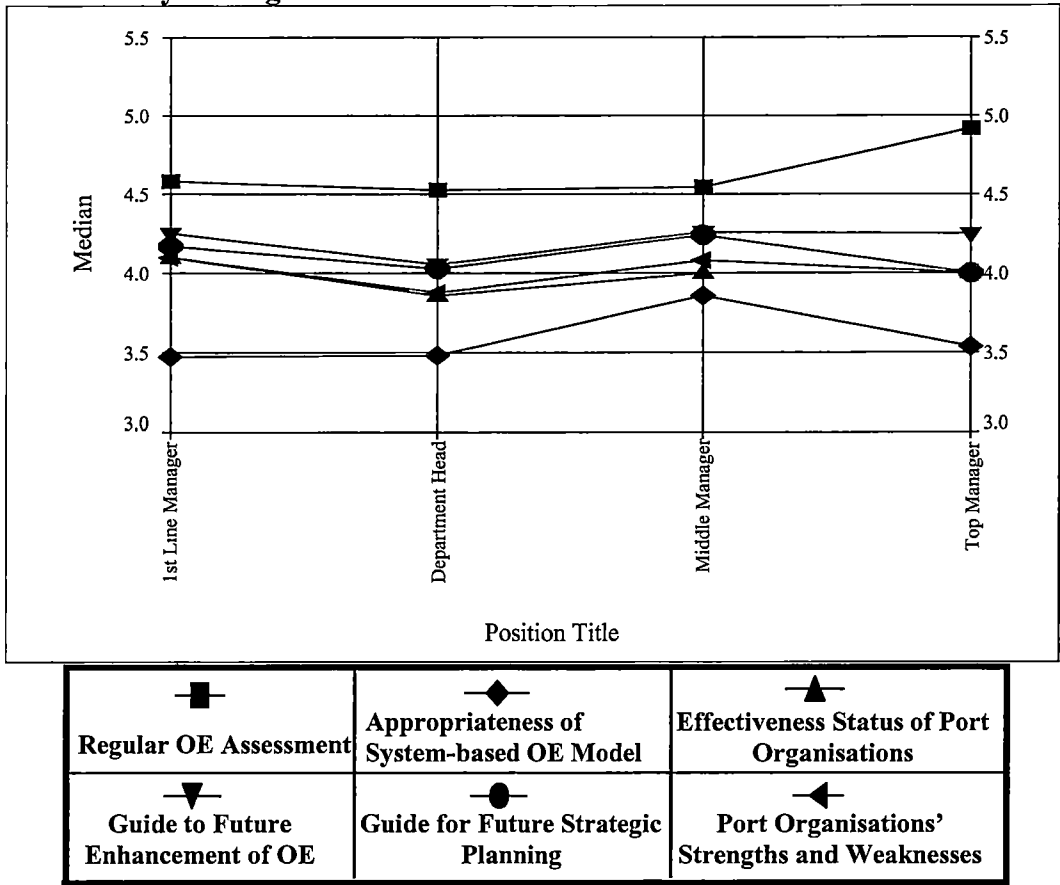
Figure 7.21: Evaluation of Port Organisations’ Regular OE Assessment Variables by Organisation Location



The results of comparing all regular OE assessment variables by PSO managers’ position titles are summarised in Figure 7.22. As can be seen from this figure, across all position titles, somewhat similar results as with the previous comparison were achieved, ‘Regular OE Assessment’ variable stood on top with an average median of 5 and ‘Appropriateness of a System-based OE Model’ variable was the lowest with average median of 3.5 (out of 5), while all other variables with average median of 4 placed in the middle of the spectrum.

There were slight differences between the frequencies of responses of different managerial ranks, but these differences were not statistically significant. That is, the statistical analysis of the above comparisons did not reveal any statistical significant differences between any of the six variables and different PSO managers’ position titles. Therefore, the results obtained from all six variables were entirely independent of managers’ position titles, indicating that the PSO managers were all highly supportive of the variables regardless of their ranks.

Figure 7.22: Evaluation of Port Organisations’ Regular OE Assessment Variables by Managers’ Position Titles

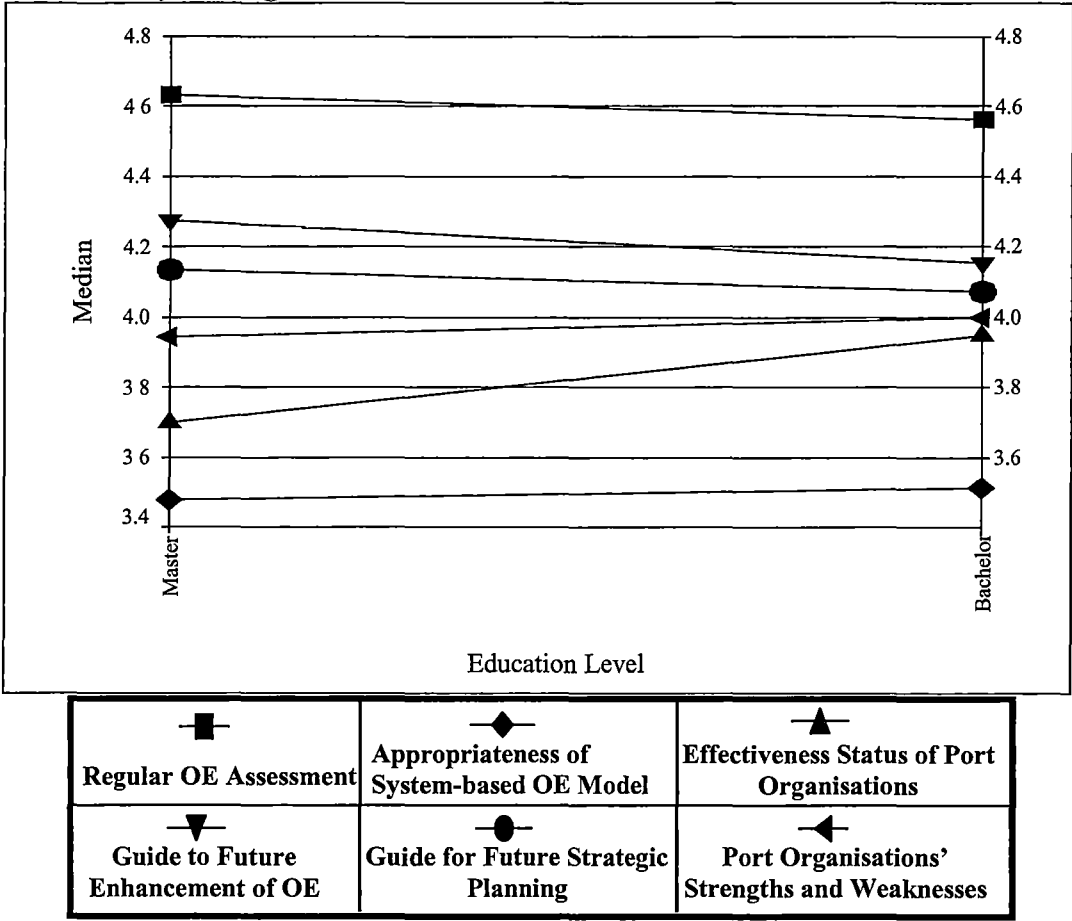


The results of evaluation of all regular OE assessment variables by PSO managers’ educational levels are summarised in Figure 7.23. As can be noted, almost similar high results as previous comparisons were achieved across both managerial educational levels, ‘Regular OE Assessment’ variable with average median of 4.5 (out of 5) being the highest and ‘Appropriateness of a System-based OE Model’ variable with average median 3.5 (out of 5) being the lowest, and all other variables with average median of 4 (out of 5) being in the middle of the spectrum.

The statistical analysis of evaluating the six variables by PSO managers’ educational levels showed that, except ‘Effectiveness Status of Port Organisations’ variable, the other five variables were not related to any particular education level. That is, all statistical tests failed to reveal significant differences between the responses to the remaining five variables and education levels. Therefore, the results obtained from these five variables were totally independent of managers’ education levels. However, there

were statistical significant differences between ‘Effectiveness Status of Port Organisations’ variable when assessed by education levels, indicating the relatedness of this variable to education levels. High majority of PSO managers possessing Bachelor degree were supportive of the proposal as compared to those holding Master degree.

**Figure 7.23: Evaluation of Port Organisations’ Regular OE Assessment Variables by Managers’ Education**



Finally, this chapter revealed that there were relationships (Spearman’s rho correlations) and significant differences between ‘Regular OE Assessment’ variable and the following variables:

- Appropriateness of a system-based OE model for regular assessment of port organisations’ effectiveness;
- Indication of port organisations’ effectiveness status as a result of regular OE assessment;
- Guidance to future enhancement of port organisations’ effectiveness as a result of regular OE assessment; and

- Indication of port organisations’ strengths and weaknesses as a result of regular OE assessment.

There was however no evidence of a significant relationship between ‘Regular OE Assessment’ and ‘Guide for Future Strategic Planning’ variables. This lack of correlation between the two variables meant that the regular OE assessment would unlikely result in any guidance for future strategic (long-term) planning in port organisations.

The overall results of the data as they related to the first research question and hypothesis (discussed above) are summarised in Table 7.53.

**Table 7.53: Summary of the Statistical Analysis Results of the First Research Question and Hypothesis**

	Reliability & Validity	Statistical Significant Difference(s) between Frequencies of Response Categories	Statistical Significant Difference(s) between Each Variable and					Correlation between Regular OE Assessment and Resultant Variables
			Organisation Location	Managers’ Position Titles	Managers’ Education Levels	Periodical OE Assessment	Future Consideration of Proposed OE Model	
V1	✓	✓	✗	✗	✗	✓	N/A	N/A
V2	✓	✓	✓	✗	✗	N/A	✓	✓
V3	✓	✓	✗	✗	✓	N/A	N/A	✓
V4	✓	✓	✗	✗	✗	N/A	N/A	✓
V5	✓	✓	✗	✗	✗	N/A	N/A	✗
V6	✓	✓	✗	✗	✗	N/A	N/A	✓

✓=Significant                      ✗=Not significant  
V1: Regular OE Assessment  
V2: Appropriateness of System-based OE Model  
V3: Effectiveness Status of Port Organisations  
V4: Future Enhancement of Effectiveness in Port Organisations  
V5: Future Strategic Planning of Port Organisations  
V6: Indication of Port Organisations’ Strengths and Weaknesses  
N/A: Not Applicable

**6.2. Summary of the Second Research Question and Hypothesis**

The second part of this chapter examined the results of the data as they related to the second research question and hypothesis:

**Q2.** What are the possible positive impacts of improved operational performance of seaports on development, as a result of higher OE of their organisation? What is the relationship between these impacts and organisation location, managers' ranks, and managers' education levels?

**H2.** Greater seaports' operational performance, as a result of higher OE, will have positive impacts on development, regardless of their location, managers' ranks, and managers' education levels.

Five different variables associated with the impacts of operational performance (OP) of seaports on country's development were examined individually, prior to comparing each of them with organisation location, managerial position titles, and managers' education levels for relatedness/independency (i.e. to find out that each variable was related to or independent of organisation location, managers' position title and education).

Finally, the existence of possible correlation between different variables of the Impacts of Seaports' Greater OP was also examined using scatterplots and Spearman's rho correlation coefficients.

In individual statistical examination of each variable of the Impacts of Seaports' Greater OP, this research found that there were high significant statistical differences between the frequencies of response categories of all five variables of the Impacts of Seaports' Greater OP. That is, all PSO managers:

- were largely in favour of the proposal that the higher the effectiveness of a port organisation, the greater will be the operational performance of its seaports;
- believed that the greater OP of seaports, as a result of higher effectiveness of their organisations, would have positive impacts on development in general;
- were greatly in favour of the proposal that the greater OP of seaports, as a result of higher effectiveness of their organisations, would positively contribute to national socio-economic development;

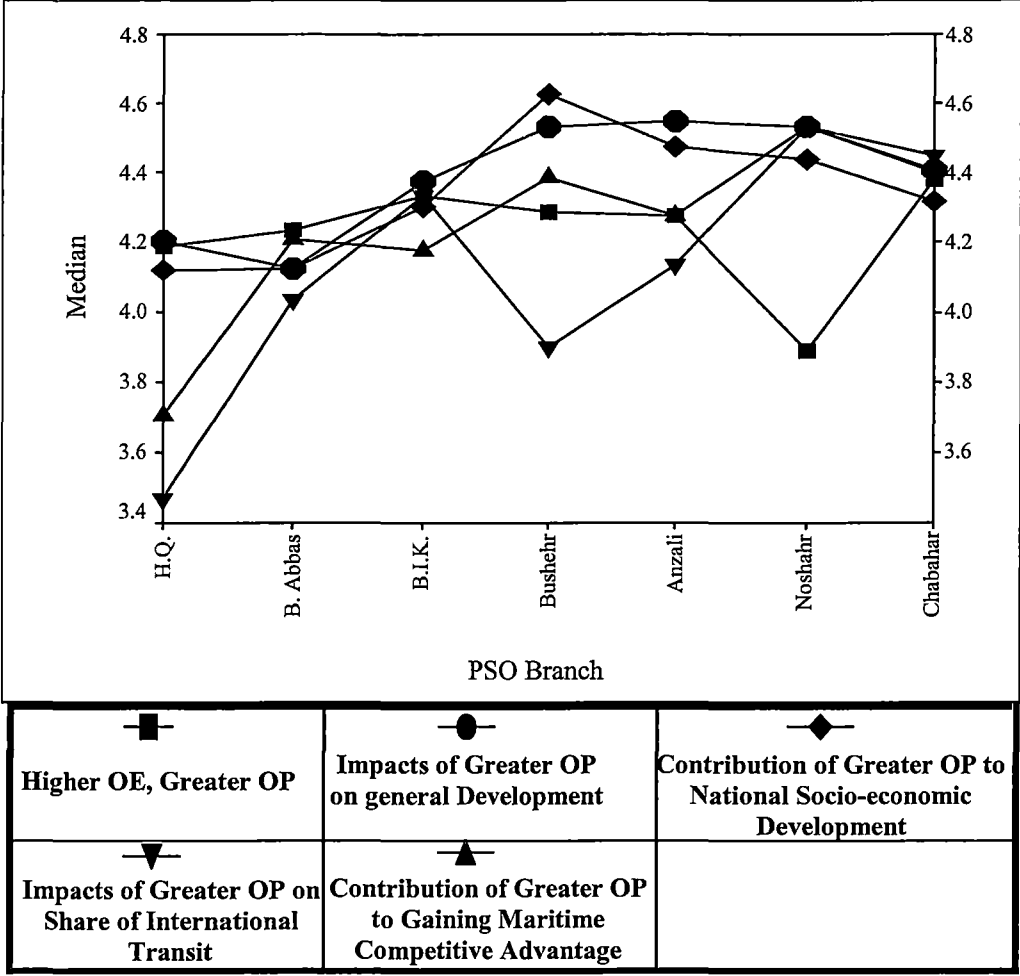
- reached a consensus that greater operational performance of seaports, as a result of higher OE of their organisations, would help the country to achieve a higher share of international transit trade; and
- were largely in favour of the issue that greater operational performance of seaports, as a result of higher OE of their organisations, would help the country to gain a maritime competitive advantage in the region (particularly among Gulf countries).

Overall evaluations of all Impacts of Seaports' Greater OP variables by organisation location are summarised in Figure 7.24. As can be seen, all variables had a relatively high median of about 4 (out of 5) on average across all PSO branches.

The statistical analysis of evaluating the above five variables by organisation location showed that, except the 'Impacts of Greater OP on Share of International Transit Trade' variable, the other four variables were not related to any particular PSO branch. That is, all statistical tests failed to reveal significant differences between the responses to four variables and organisation location. Therefore, the results obtained from these four variables were totally independent of organisation location. However, there were statistical significant differences between the 'Impacts of Greater OP on Share of International Transit Trade' variable when assessed by organisation location, indicating the dependency of this variable to organisation location. Managers in B.I.K., Noshahr, and Chabahar tended to be more in favour of the proposal than those in other branches.



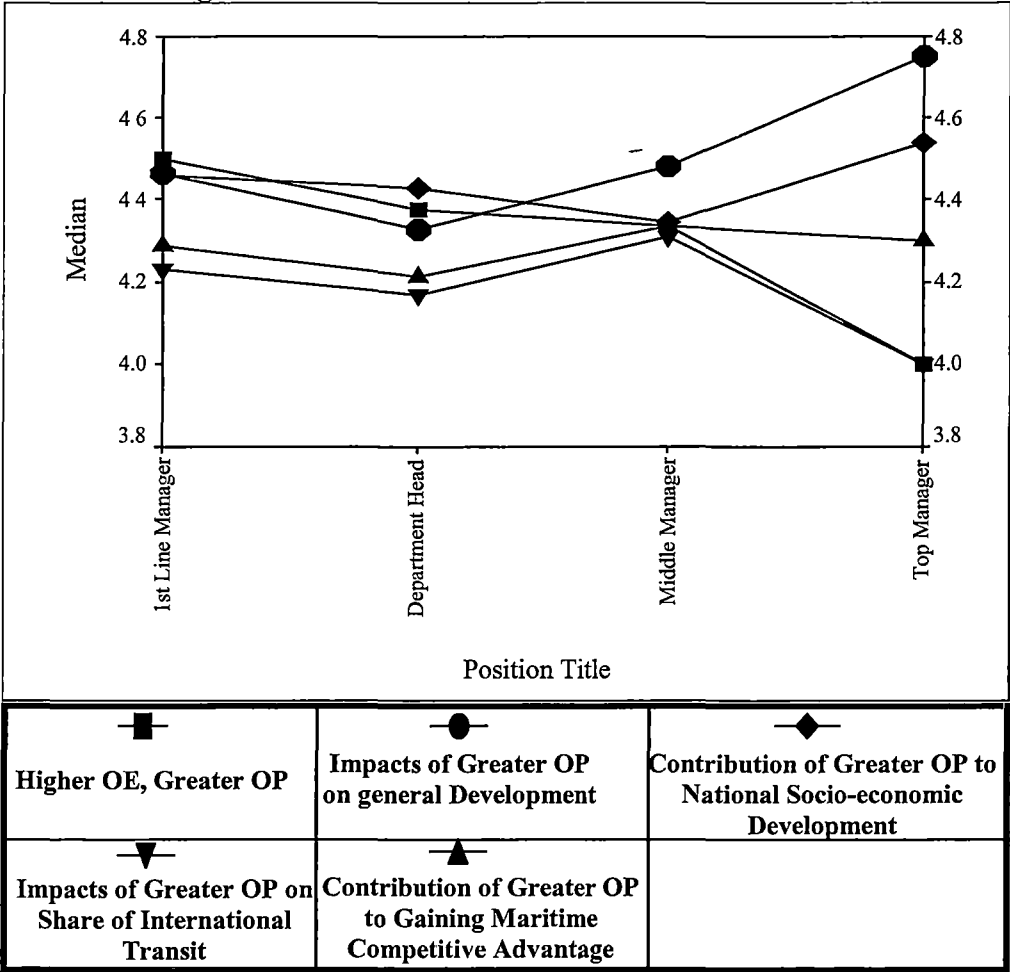
**Figure 7.24: Evaluation of the Impacts of Seaports’ Greater OP Variables by Organisation Location**



The results of comparing all Impacts of Seaports’ Greater OP variables by PSO managers’ position titles are summarised in Figure 7.25. As it is evident from this figure, convincingly high median results were achieved across all position titles, with all variables scoring well above 4 (out of 5).

There were slight differences between the frequencies of responses of different managerial ranks, but these differences were not statistically significant. That is, the statistical analysis of the above comparisons did not reveal any statistical significant differences between any of the five variables and different PSO managers’ position titles. Therefore, the results obtained from all five variables were entirely independent of managers’ position titles, indicating that the PSO managers were all highly supportive of all five variables regardless of their ranks.

**Figure 7.25: Evaluation of the Impacts of Seaports’ Greater OP Variables by Managers’ Position Titles**

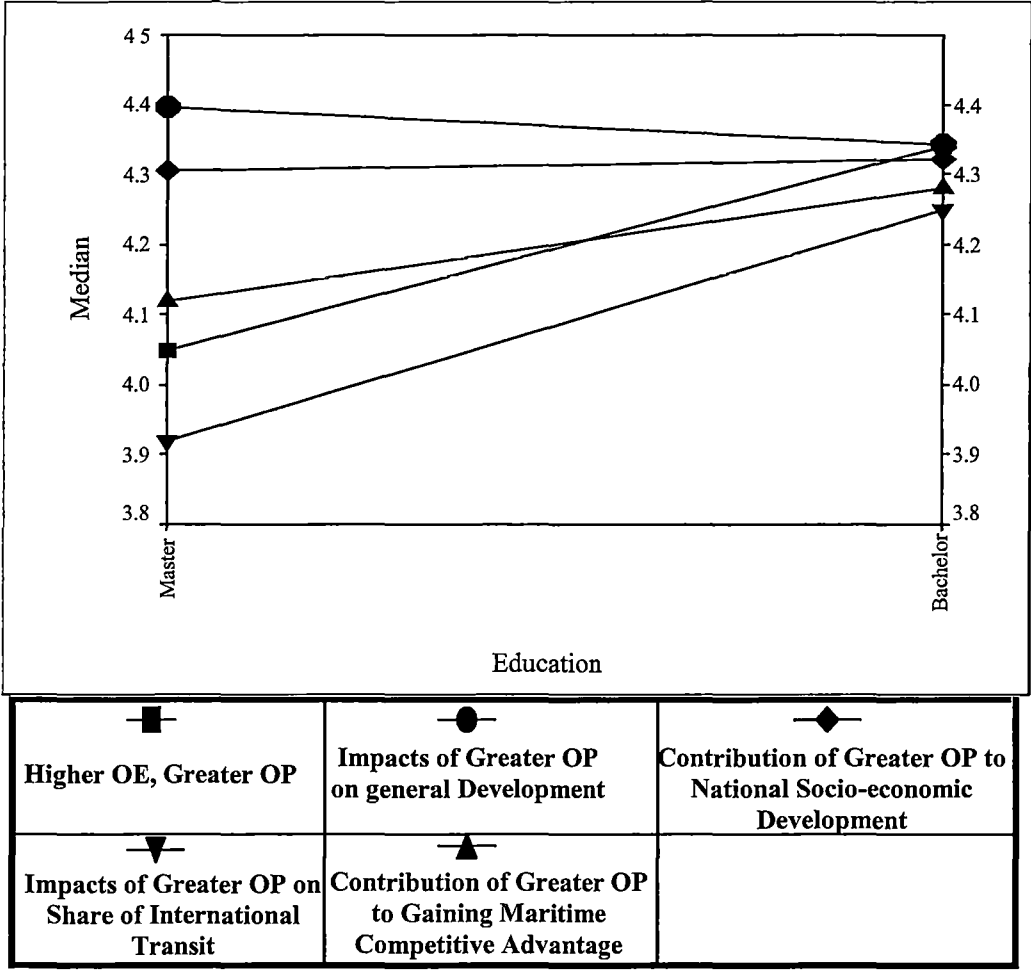


The results of evaluation of all Impacts of Seaports’ Greater OP variables by PSO managers’ educational levels are summarised in Figure 7.26. As can be noted, almost similar high results as previous comparisons were achieved across both managerial educational levels, with all variables averaging around median 4 (out of 5).

The statistical analysis of evaluating the above five variables by PSO managers’ educational levels showed that, except ‘Higher OE Greater OP’ (seaport’s greater OP, as a result of higher OE of their organisations) variable, the other four variables were not related to any particular education level. That is, all statistical tests failed to reveal significant differences between the responses to the remaining four variables and education levels. Therefore, the results obtained from these four variables were totally independent of managers’ education levels. However, there were statistical significant differences between ‘Higher OE Greater OP’ variable when assessed by education

levels, indicating the relatedness of this variable to education levels. High majority of PSO managers possessing BSc. degree were more in favour of the proposal than those with MSc. degree.

**Figure 7.26: Evaluation of the Impacts of Seaports’ Greater OP Variables by Managers’ Education**



Finally, this chapter revealed that there were relationships (Spearman’s rho correlations) and significant differences between the proposal of ‘Greater OP as a Result of Higher OE’ and the four resultant variables that are summarised as follows:

- Greater seaports’ OP, as a result of higher effectiveness of their organisations, will have positive impacts on national development in general;
- Greater seaports’ OP, as a result of higher effectiveness of their organisations, will positively contribute to national socio-economic development in particular;



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# Chapter 8

## Result of the Survey—Research Question 3

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### 1. Introduction

The objectives of this chapter are to report the results of the survey of OE of Iran's PSO and to present the analysis of the collected data with respect to the third research question and hypothesis. The methods of data preparation and respondents' demographic information have already been discussed in the preceding chapter and will not be repeated here. Similarly, the primary statistical assumptions that were made for the analysis of the data related to the first and second research questions are valid and applicable to the data related to the third research question. That is, firstly a Cronbach's alpha of 0.6 was set as the minimum acceptable level of internal reliability for the scales of this research. Secondly, only factor loadings of above 0.5 were considered significant and important. However, it should be noted that, prior to factor analysis, the data were transformed into suitable formats wherever the assumptions and practical considerations underlying the application of factor analysis were violated (Coakes & Steed 2001). Thirdly, the significance level ( $\alpha$ ) also should have been set in advance to hypotheses testing. Therefore, a significance level of 5 per cent ( $\alpha = 0.05$ ), which is the most common significance level for business and management research (Cavana et al. 2001), was set for this study. That is, a significance level of 5 per cent ( $\alpha = 0.05$ ) indicates that the confidence level is 95 per cent.

As far as the data analysis is concerned, this chapter uses appropriate statistical techniques to achieve three objectives: getting a feel for the data (descriptive statistics), testing the goodness of data (i.e. Cronbach's alpha and principal component factor analysis as measures of reliability and validity), and testing the hypotheses (i.e.

appropriate statistical manipulation including bivariate, correlation techniques, etc.) and/or answering the questions developed for this research (Sekaran 2000).

## 2. Deriving Correct OE Criteria from the Survey

As thoroughly explained in chapter 5, this research generated a system-based model of OE by synthesising and clustering 28 criteria, which have been identified through critical examination of available OE indicators for assessing effectiveness of seaport organisations, into three phases of an open system (input, transformation and output) and into an additional phase titled as OE Attributes (Figure 5.2, Chapter 5). The clustering of these criteria was entirely hypothetical and meant to be approved/disapproved through an empirical survey. Therefore, this section and its subsections are structured around the third research question and hypothesis:

- Q3.** How can the effectiveness of seaport organisations be assessed/measured? And what are the appropriate criteria for assessing/measuring OE of Iran's seaport organisation?
- H3.** The correct criteria for assessing OE in seaport organisations can be identified and grouped into a meaningful system-based model comprising an Input phase, a Transformation phase, an Output phase and OE attributes (common criteria).

Each criterion in the hypothesised system-based model will be examined individually and in groups in the following subsections with respect to the results of the survey. In view of the fact that response categories of the questions related to these sub-hypotheses are not perfectly interval, a series of nonparametric statistical techniques will be utilised to analyse the results (Harris 1998).

With respect to reliability and validity of different items of the model, the data were subjected to Cronbach's alpha reliability coefficient and principal component factor analysis.

With respect to statistical analysis, in addition to descriptive statistics (graphs, charts, and tables), each criterion was explored by the following statistical tests:

- One-sample Chi-square and one-sample Kolmogorov-Smirnov (the goodness-of-fit types) to test whether significant difference(s) existed between an observed number of responses falling in each category and an expected (or predicted) number based upon the null hypothesis.
- The Binomial test, after transforming the five response categories into binary categories (Yes and No, or Success and Failure), to measure whether a distribution of values was binomially distributed, with the assumption that any outcome was equally likely. It was of legitimate interest to see if the distribution differed significantly from the binomial assumption of equal probability of either (George & Mallery 2005).
- Another one-sample Chi-square test to test for the even/uneven spread among negative responses (Nos). That is, the test only considered the four negative responses to each criterion.

Finally, criteria in each phase of the system-based model (i.e. Input, Transformation, Output, and Attribute) were collectively subjected to 'Cochran's  $Q$  test for  $k$  related samples' to firstly compare the responses, and secondly to test whether there was a significant difference in the responses (Yes and No, or Success and Failure) of respondents in each phase.

As it is obvious from above explanation, each criterion was subjected to four individual statistical tests and one group test. That is, the same statistical processes were repeated for each and every criterion. Therefore, in order to avoid repetitiveness and to save space in the main body of this thesis, some of the analyses (including charts, graphs, and tables) are transferred to appendices and reference is made to the relevant appendix at each section.

## **2.1. Appropriate Criteria for OE Assessment of seaport Organisations at Input Phase of the System-Based Model**

This section addresses the statistical analysis related to hypothesised OE criteria at the Input phase of the hypothetical model (i.e. Leadership, Reliability, External support,

Professionalism, Autonomy, Human behaviour, Resource acquisition, and Initiation/Innovation).

Each criterion related to the Input phase of the system-based model was evaluated using a categorical scale with the following dimensions:

1. Yes;
2. No/Transformation;
3. No/Output;
4. No/Attribute; and
5. No/Not OE.

The analyses and presentation of related data was carried out in three ways. Firstly, measures of reliability and validity (Cronbach's alpha and principal component factor analysis) will be discussed to test the reliability and validity of collected data. Secondly, descriptive statistics will be used to get a feel for the data. Thirdly, appropriate statistical techniques will be conducted to test the hypotheses. All results, tables and charts using Input criteria were derived from answers to related questions in the survey instrument.

### **2.1.1. Internal Consistency and Validity of Data at Input Phase**

The scales of 8 variables of OE criteria at Input phase of the model were subjected to inter-item consistency reliability (Cronbach's alpha reliability coefficient) and factor analysis. The results indicated that the variables 'External Support' and 'Resource Acquisition' had very low corrected item-total correlation values, with factor loadings of less than .5, and therefore had to be eliminated from further statistical process<sup>19</sup>.

The Cronbach's alpha score ( $\alpha$ ) for the remaining six variables of Input phase was at an acceptable level of 0.7346 and factor loadings were all above .5 (Table 8.1), indicating that they measured the same underlying construct (i.e. Input).

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<sup>19</sup> Further to ensure that the correct decision was made, the negative responses (four categories) to these two criteria were subjected to different one-sample statistical tests, and all tests failed to reveal significant differences between frequencies of their response categories.



**Table 8.1: Internal Consistency (Cronbach's alpha reliability coefficient) and Validity Analyses of Input Phase Items**

	Corrected Item-Total Correlation	Alpha if Item Deleted	Factor Loadings	N of Cases	Alpha Score
<b>Leadership</b>	0.4247	0.7103	0.648	180	0.7346
<b>Reliability</b>	0.4849	0.6930	0.687		
<b>Professionalism</b>	0.4694	0.6988	0.676		
<b>Autonomy</b>	0.5365	0.6771	0.691		
<b>Human Behaviour</b>	0.4182	0.7118	0.529		
<b>Initiation/Innovation</b>	0.4876	0.6922	0.642		

\*Rotation Method: Varimax with Kaiser Normalisation

### 2.1.2. Description of Input Phase Data

As mentioned earlier, all tabular and graphical presentations (suitable for descriptive analysis) related to Input criteria are illustrated in Appendix 12 and only discussions are presented here. Therefore, this section aims to summarise the PSO managers' responses to each criterion of the Input phase of the proposed model in terms of frequency of occurrence and percentage.

**Leadership:** The bar and pie charts (Figure 1, Appendix 12) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of this criterion respectively. As can be seen from these charts and Table 1 (Appendix 12), the majority of PSO managers (130 or 72.2 per cent) approved that Leadership is firstly a correct criterion of OE and secondly a correct criterion at the Input phase of the system-based model, while only 50 managers (27.8 per cent) believed that it either belongs to other phases or not an OE indicator at all.

When the four negative responses of Leadership criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 1 and Figure 2, Appendix 12), it was noted that, of the 50 managers who disagreed with the assumption that Leadership is a correct criterion of OE at Input phase, most of them (78.0 per cent) believed that this criterion belongs to Attribute (i.e. it is a common criterion of OE across all three phases of a system).

**Reliability:** The bar and pie charts (Figure 3, Appendix 12) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Reliability criterion respectively. As it is evident from these charts and Table 2 (Appendix 12), majority of PSO managers (126 or 70.0 per cent) trusted that Reliability is a correct criterion of OE for seaport organisations as well as being a correct criterion at Input phase of the system-based model, while 30.0 per cent of managers believed that it is either not a indicator of OE at all or it belongs to other phases of the system-based model.

A separate evaluation of the four categories of negative responses of Reliability (last column of Table 2 and Figure 4, Appendix 12) made it clear that, of the 54 managers who were against the proposal, below half of them (44.4 per cent) declared that the Reliability is a common OE criterion across all phases of a system, while a minority of 13.0 per cent did not accept it as a correct indicator of OE in seaport organisation.

**Professionalism:** The bar and pie charts (Figure 5, Appendix 12) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Professionalism criterion respectively. As can be seen from these charts and Table 3 (Appendix 12), a very high percentage of PSO managers (80.6 per cent or 145 managers) were in favour of Professionalism being a correct measure of OE for seaport organisations as well as a correct criterion at Input phase of the system-based model. Consequently, only 17.7 per cent believed that it belongs to other phases of the system, while 3 managers (1.7 per cent) were totally against the issue.

Examining the four frequencies of negative responses of the Professionalism criterion separately (last column of Table 3 and Figure 6, Appendix 12) revealed that, of the 35 managers who responded negatively, the majority believed that Professionalism is a common criterion across all phases of the model and should be treated as an Attribute criterion.

**Autonomy:** The bar and pie charts (Figure 7, Appendix 12) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Autonomy criterion respectively. As it is apparent from these charts and Table 4 (Appendix 12), of

the 180 PSO managers, 121 managers (67.2 per cent) agreed that Autonomy is firstly a correct indicator of OE in seaport organisations and secondly it is a correct criterion at the Input phase of the proposed model, and the remainder (59 managers or 32.8 per cent) believed it should either be clustered to other phases of the model or to be completely dropped from the model.

Inspection of the Autonomy's negative responses separately (last column of Table 4 and Figure 8, Appendix 12) showed a moderate spread of frequency across the four response categories, with 23.7 per cent believing this criterion belongs to the Transformation phase, 13.6 per cent to the Output phase, and 44.1 per cent to Attribute, while 18.6 per cent were totally against the proposal that Autonomy is a correct indicator of OE in seaport organisations.

**Human Behaviour:** The bar and pie charts (Figure 9, Appendix 12) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Human Behaviour criterion respectively. These charts along with Table 5 (Appendix 12) show that about 74 per cent of PSO managers have responded positively to Human Behaviour as an appropriate criterion for assessing OE in seaport organisations in addition to being a correct criterion at the Input phase of the model, while only about 26 per cent were against these suggestions.

When the four negative responses of the Human Behaviour criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 5 and Figure 10, Appendix 12), it was again found that, of the 47 managers who disagreed with the assumption that Human Behaviour is a correct measure of OE at the Input phase, less than half of them (44.7 per cent) believed that Human Behaviour should be treated as a common indicator of OE across all three phases of a system,

**Initiation/Innovation:** The bar and pie charts (Figure 11, Appendix 12) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of this criterion respectively. As can be seen from these graphs and Table 6 (Appendix 12), exactly two third of PSO managers (66.7 per cent or 120 managers) agreed that

Initiation/Innovation is both a correct measure of OE in seaport organisations and a correct criterion at the Input phase of the system-based model.

When the remaining one third (33.3 per cent or 60 managers) with negative responses were checked separately (last column of Table 6 and Figure 12, Appendix 12), almost the same results as previous criteria were found. That is, less than half of PSO managers (46.7 per cent) believed that it is common criterion across all phases of the system-based model.

### 2.1.3. One-Sample Tests for Goodness-of-Fit of Input Criteria (5 Categories)

In order to determine whether statistical significant difference(s) existed among 5 different frequencies of responses, each of the six variables of the Input phase of the system-based model was subjected to two one-sample tests; namely a Chi-square test and a Kolmogorov-Smirnov test, the results of which are shown in Table 8.2.

**Table 8.2: The Result of One-Sample Tests of Input Phase Criteria (5 Categories)**

	Chi-square ( $\chi^2$ )*			Kolmogorov-Smirnov*	
	Value	df	P	Z value	p
<b>Leadership</b>	333.056	4	.000	5.970	.000
<b>Reliability</b>	285.833	4	.000	5.658	.000
<b>Professionalism</b>	416.500	4	.000	6.405	.000
<b>Autonomy</b>	256.056	4	.000	5.447	.000
<b>Human Behaviour</b>	330.778	4	.000	5.926	.000
<b>Innovation</b>	253.611	4	.000	5.468	.000

\*  $\alpha < 0.05$

As can be seen from the above table, both Chi-square and Kolmogorov-Smirnov tests for goodness-of-fit revealed significant differences between the frequencies of five response categories of all variables. That is, both tests yielded a  $p$  value of .000 ( $p < 0.05$ ) for all variables. Inspection of the data related to these variables revealed that these differences were mainly between positive responses (Yes scores) and all other four negative responses (No scores).

### 2.1.4. Binomial Test for Binary Categories of Input Criteria (2 Categories)

In order to use the Binomial test, the five response categories of the Input criteria had to be converted into binary categories. Therefore, four negative response categories (i.e. No/Transformation, No/Output, No/Attribute, and No/Not OE) of each variable were collapsed into one category signifying negative responses, while preserving the original positive responses (i.e. Yes). Subsequently, the binary categories of each Input variable (reflecting the 'Total' column of Tables 1 to 6 and Figures 1.b., 3.b., 5.b., 7.b., 9.b., and 11.b. of Appendix 12) were put through a Binomial test for comparing the positive and negative responses, the results of which are tabulated in Table 8.3.

**Table 8.3: The Result of Binomial Test of Input Phase Criteria (2 Categories)**

	Category	Observed Prop.	Binomial Test*	
			Test Prop.	P**
Leadership	Yes	.7	.5	.001
	No	.3		
Reliability	Yes	.7	.5	.004
	No	.3		
Professionalism	Yes	.8	.5	.000
	No	.2		
Autonomy	Yes	.7	.5	.029
	No	.3		
Human Behaviour	Yes	.7	.5	.000
	No	.3		
Initiation/Innovation	Yes	.7	.5	.040
	No	.3		

\* $\alpha < 0.05$

\*\*Based on Z approximation

As it is evident from the above table, the Binomial test of comparing positive and negative responses to Leadership, Reliability, Professionalism, Autonomy, Human Behaviour, and Initiation/Innovation variables revealed that the  $p$  value associated with these comparisons were .001, .004, .000, .029, .000, and .040 ( $p < 0.05$ ) respectively, indicating that the number of positive and negative responses of each criterion did differ significantly from the binomial assumption of equal probability. These differences were mainly caused by the higher observed proportion of positive responses of all variables compared to those of negative responses (about 2.5 times higher).

2.1.5. One-Sample Test for Negative Responses of Input Criteria (4 Categories)

The negative responses (i.e. No/Transformation, No/Output, No/Attribute, and No/Not OE) of each Input variable were subjected to a one-sample chi-square test to examine the even/uneven spread among negative responses (Nos). The results of this test are illustrated in Table 8.4—reflecting the last column of Tables 1 to 6, Appendix 12.

The one-sample Chi-square test found significant differences among the frequencies of negative responses of all six Input criteria. The Chi-Square values, with 3 degrees of freedom, had very small significant levels ranging from .000 to .007 ( $p<0.05$ ), which demonstrated that the breakdown of negative responses deviated substantially from the expected values (equal frequency of each response category). The difference was predominantly between Attribute and all other negative categories (Transformation, Output, and Not OE).

Table 8.4: The Result of One-Sample Test for Negative Responses of Input Phase Criteria (4 Categories)

	Chi-square ( $\chi^2$ )		
	Value	df	P
Leadership	75.600	3	.000
Reliability	12.222	3	.007
Professionalism	16.314	3	.001
Autonomy	12.661	3	.005
Human Behaviour	12.489	3	.006
Innovation	20.667	3	.000

2.1.6. Group Test of Input Criteria for Success and Failure

In addition to the preceding sections in which each criterion was independently and separately exposed to different statistical tests, this section addresses a condition where all six criteria of the Input phase of the system-based model (binary categories) were collectively subjected to ‘Cochran’s  $Q$  test for k related samples’ to firstly compare the responses, and secondly to test whether there was a significant difference in the responses (Yes and No, or Success and Failure) of respondents at the Input phase. The result of this test is shown in Table 8.5.

**Table 8.5: The Result of Cochran's  $Q$  Test of Input Phase Criteria**

	Frequency		Cochran's $Q$	df	$p$
	1=Yes	2=No			
<b>Leadership</b>	130	50	19.960*	5	.005
<b>Reliability</b>	126	54			
<b>Professionalism</b>	145	35			
<b>Autonomy</b>	121	59			
<b>Human Behaviour</b>	133	47			
<b>Innovation</b>	120	60			

\*1 is treated as a success

As can be seen from the above table, the Cochran's  $Q$  test revealed significant difference when all six Input variables were compared. The  $Q$  value of 19.960 was significant at .005 ( $p < 0.05$ ), indicating that the positive category of responses in all six variables was treated as a success.

### **2.1.7. Respondents' Inputs in Input Phase of the System-Based OE Model**

As each respondent had the chance of proposing additional criteria to be added to the hypothetical list of OE indicators at the Input phase of the system-based model, this section describes the valid suggestions provided by respondents. Broadly speaking, the number of PSO managers who expressed their opinion was relatively low and might not affect the overall result of the survey, however from the research ethics point of view, they are all reported below.

Of the 147 PSO managers (out of 180) who responded to the relevant question, 118 (80.3 per cent) did not have any specific suggestion at all, and the remaining 29 (19.7 per cent) managers have given a wide variety of responses, which are listed in Table 8.6 with their associated frequencies and percentages in a descending order.

**Table 8.6: PSO Managers' Criteria Suggestions for Inclusion in Input Phase**

<b>No.</b>	<b>OE Criteria</b>	<b>Frequency</b>	<b>%</b>
1	HR Development	8	19.0
2	Information Management & Communication	7	16.7
3	Planning	6	14.3
4	Employee Satisfaction	5	11.9
5	Job Security	3	7.1
6	Organisational Worth	2	4.8
7	Stability	2	4.8
8	Morale	2	4.8
9	Flexibility	1	2.4
10	Customer Satisfaction	1	2.4
11	Quality	1	2.4
12	Supervision	1	2.4
13	Organisational Discipline	1	2.4
14	Evaluation	1	2.4
15	Reward Management	1	2.4

As can be noted from Table 8.6, a total of 15 criteria were suggested by PSO managers for inclusion in the Input phase of the proposed model, with HR Development that was suggested by 8 managers being on top of the list and so on.

## **2.2. Appropriate Criteria for OE Assessment of Seaport Organisations at Transformation Phase of the System-Based Model**

This section addresses the statistical analysis related to hypothesised OE criteria at the Transformation phase of the system-based model (i.e. Planning, Evaluation, Information management and communication, and Conformity).

Each criterion related to the Transformation phase of the system-based model was evaluated using a categorical scale with the following dimensions:

1. Yes;
2. No/Input;
3. No/Output;
4. No/Attribute; and
5. No/Not OE.



The analyses and presentation of related data was carried out in three ways. Firstly, measures of reliability and validity (Cronbach's alpha and principal component factor analysis) will be discussed to test the reliability and validity of collected data. Secondly, descriptive statistics will be used to get a feel for the data. Thirdly, appropriate statistical techniques will be conducted to test the hypotheses. All results, tables and charts using Transformation criteria were derived from answers to related questions in the survey instrument.

### 2.2.1. Internal Consistency and Validity of Data at Transformation Phase

The scales of 4 OE criteria at Transformation phase were put through inter-item consistency reliability (Cronbach's alpha reliability coefficient) and factor analysis. The results showed that the variable 'Conformity' had a negative corrected item-total correlation values, with factor loadings of less than .5, and therefore had to be eliminated from further statistical analysis.

The Cronbach's alpha score ( $\alpha$ ) for the remaining three variables of Transformation Phase was at an acceptable level of 0.7358 and factor loadings were all above .5 (Table 8.7), indicating that they measured the same underlying construct (i.e. Transformation).

**Table 8.7: Internal Consistency (Cronbach's alpha reliability coefficient) and Validity Analyses of Transformation Phase Items**

	Corrected Item-Total Correlation	Alpha if Item Deleted	Factor Loadings	N of Cases	Alpha Score
Planning	0.5427	0.7189	0.697	180	0.7358
Evaluation	0.5482	0.7228	0.684		
Info. Manag. & Comm.	0.5613	0.7243	0.664		

### 2.2.2. Description of Transformation Phase Data

As previously explained, all tabular and graphical presentations (suitable for descriptive analysis) related to Transformation criteria are illustrated in Appendix 13 and only discussions are presented here. Therefore, this section aims to report a summary of the

PSO managers' responses to each criterion of the Transformation phase of the proposed model in terms of frequency of occurrence and percentage.

**Planning:** The bar and pie charts (Figure 1, Appendix 13) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of this criterion respectively. As can be seen from these charts and Table 1 (Appendix 13), the majority of PSO managers (144 or 80.0 per cent) approved that Planning is firstly a correct criterion of OE and secondly a correct criterion at the Transformation phase of the system-based model, while only 36 managers (20.0 per cent) believed that it either belongs to other phases or not an OE indicator at all.

When the four negative responses of Planning criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 1 and Figure 2, Appendix 13), it was noted that, of the 36 managers who disagreed with the assumption that Planning is a correct criterion of OE at Transformation phase, most of them (about 70.0 per cent) believed that this criterion belongs to Attribute (i.e. it is a common measure of OE across all three phases of a system).

**Evaluation:** The bar and pie charts (Figure 3, Appendix 13) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Evaluation criterion respectively. As it is apparent from these charts and Table 2 (Appendix 13), of the 180 PSO managers, 146 managers (81.1 per cent) agreed that Evaluation is firstly a correct indicator of OE in seaport organisations and secondly it is a correct criterion at the Transformation phase of the proposed model, and the remainder (34 managers or 18.9 per cent) believed it should either be clustered to other phases of the model or to be completely dropped from the model.

Inspection of the Evaluation's negative responses separately (last column of Table 2 and Figure 4, Appendix 13) showed that, of the 34 managers who responded negatively, exactly half of them (50.0 per cent) believed that Evaluation is a common criterion across all phases of the model and should be treated as an Attribute criterion, while 41.2 per cent considered it as an Output criterion and only 8.8 per cent disbelieved on Evaluation being a correct measure of OE in seaport organisations.

**Information Management and Communication:** The bar and pie charts (Figure 5, Appendix 13) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Information Management and Communication criterion respectively. These charts along with Table 3 (Appendix 13) show that about 76 per cent of PSO managers have responded positively to Information Management and Communication as an appropriate criterion for assessing OE in seaport organisations in addition to being a correct criterion at the Transformation phase of the model, while only about 24 per cent were against these suggestions.

A separate evaluation of the four categories of negative responses of Information Management and Communication (last column of Table 3 and Figure 6, Appendix 13) made it clear that, of the 44 managers who were against the proposal, more than half of them (52.3 per cent) declared that the Information Management and Communication is a common OE criterion across all phases of a system and should be treated as an Attribute criterion.

**2.2.3. One-Sample Tests for Goodness-of-Fit of Transformation Criteria (5 Categories)**

In order to determine whether statistical significant difference(s) existed among 5 different frequencies of responses, each of the three variables of the Transformation phase of the system-based model was subjected to two one-sample tests; namely a Chi-square test and a Kolmogorov-Smirnov test, the results of which are shown in Table 8.8.

**Table 8.8: The Result of One-Sample Tests of Transformation Phase Criteria (5 Categories)**

	Chi-square ( $\chi^2$ )*			Kolmogorov-Smirnov*	
	Value	df	P	Z value	p
Planning	296.933	3	.000	6.402	.000
Evaluation	304.667	3	.000	6.579	.000
Info. Manag. & Comm.	353.056	4	.000	6.090	.000

\*  $\alpha < 0.05$

As can be seen from the above table, both Chi-square and Kolmogorov-Smirnov tests for goodness-of-fit revealed significant differences between the frequencies of five response categories of all three variables of Transformation phase. That is, both tests yielded a  $p$  value of .000 ( $p < 0.05$ ) for all variables. Inspection of the data related to these variables revealed that these differences were mainly between positive responses (Yes scores) and all other four negative responses (No scores).

#### 2.2.4. Binomial Test for Binary Categories of Transformation Criteria (2 Categories)

For a Binomial test to be applicable, the five response categories of the Transformation criteria had to be converted into binary categories. Therefore, four negative response categories (i.e. No/Input, No/Output, No/Attribute, and No/Not OE) of each variable were collapsed into one category signifying negative responses, while preserving the original positive responses (i.e. Yes). Subsequently, the binary categories of each Input variable (reflecting the 'Total' column of Tables 1 to 3 and Figures 1.b., 3.b., and 5.b. of Appendix 13) were put through a Binomial test for comparing the positive and negative responses, the results of which are tabulated in Table 8.9.

**Table 8.9: The Result of Binomial Test of Transformation Phase Criteria (2 Categories)**

	Category	Observed Prop.	Binomial Test*	
			Test Prop.	P**
Planning	Yes	.8	.5	.000
	No	.2		
Evaluation	Yes	.8	.5	.002
	No	.2		
Info. Manag. & Comm.	Yes	.8	.5	.001
	No	.2		

\* $\alpha < 0.05$

\*\*Based on Z approximation

As it is evident from the above table, the Binomial test of comparing positive and negative responses to Planning, Evaluation, and Information management and communication variables revealed that the  $p$  value associated with these comparisons were .000, .002, and .001 ( $p < 0.05$ ) respectively, indicating that the number of positive and negative responses of each criterion did differ significantly from the binomial assumption of equal probability. These differences were mainly caused by the higher

observed proportion of positive responses of all variables compared to those of negative responses (about 4 times higher).

### 2.2.5. One-Sample Test for Negative Responses of Transformation Criteria (4 Categories)

The negative responses (i.e. No/Input, No/Output, No/Attribute, and No/Not OE) of each Transformation variable were subjected to a one-sample chi-square test to examine the even/uneven spread among negative responses (Nos). The results of this test are illustrated in Table 8.10—reflecting the last column of Tables 1 to 3, Appendix 13.

**Table 8.10: The Result of One-Sample Test for Negative Responses of Transformation Phase Criteria (4 Categories)**

	Chi-square ( $\chi^2$ )		
	Value	df	P
<b>Planning</b>	24.500	2	.000
<b>Evaluation</b>	9.588	2	.008
<b>Info. Manag. &amp; Comm.</b>	19.091	3	.000

The one-sample Chi-square test found significant differences among the frequencies of negative responses of all three Transformation criteria. The Chi-Square values, with 2 degrees of freedom for Planning and Evaluation and 3 degrees of freedom for Information Management and Communication, were significant at .000, .008, and .000 ( $p < 0.05$ ) respectively, which demonstrated that the breakdown of negative responses deviated substantially from the expected values (equal frequency of each response category). The difference was mainly between Attribute and all other negative categories (Input, Output, and Not OE).

### 2.2.6. Group Test of Transformation Criteria for Success and Failure

In addition to the preceding sections in which each criterion was independently and separately exposed to different statistical tests, this section addresses a condition where all three criteria of the Transformation phase of the system-based model (binary categories) were collectively subjected to 'Cochran's  $Q$  test for  $k$  related samples' to firstly compare the responses, and secondly to test whether there was a significant

difference in the responses (Yes and No, or Success and Failure) of respondents at the Transformation phase. The result of this test is shown in Table 8.11.

**Table 8.11: The Result of Cochran’s  $Q$  Test of Transformation Phase Criteria**

	Frequency		Cochran's $Q$	df	$p$
	1=Yes	2=No			
Planning	144	36	2.435*	2	.296
Evaluation	146	34			
Info. Manag. & Comm.	136	44			

\*1 is treated as a success

As can be seen from above table, the Cochran’s  $Q$  test did not reveal significant difference when all three Transformation variables were compared. The  $Q$  value of 2.435 was significant at .296 ( $p>0.05$ ). This large level of significance indicates that all three variables being treated almost the same by all respondents, with the positive category of responses still being a success.

**2.2.7. Respondents’ Inputs in Transformation Phase of the System-Based OE Model**

As each respondent had the chance of proposing additional criteria to be added to the hypothetical list of OE indicators at the Transformation phase of the system-based model, this section describes the valid suggestions provided by respondents. Broadly speaking, the number of PSO managers who expressed their opinion was relatively low and might not affect the overall result of the survey, however from the research ethics point of view, they are all reported below.

Of the 162 PSO managers (out of 180) who responded to the relevant question, 133 (82.1 per cent) did not have any specific suggestion at all, and the remaining 29 (17.9 per cent) managers have given a wide variety of responses, which are listed in Table 8.12 with their associated frequencies and percentages in a descending order.

As can be noted from Table 8.12, a total of 19 criteria were suggested by PSO managers for inclusion in the Transformation phase of the proposed model, with Supervision suggested by 7 managers being on top of the list and so on.

**Table 8.12: PSO Managers' Criteria Suggestions for Inclusion in Transformation Phase**

No.	OE Criteria	Frequency	%
1	Supervision	7	17.9
2	HR Development	6	15.4
3	Human Behaviour	4	10.3
4	Customer Satisfaction	2	5.1
5	Reliability	2	5.1
6	Leadership	2	5.1
7	Professionalism	2	5.1
8	External Support	2	5.1
9	Resource Acquisition	2	5.1
10	Employee Satisfaction	1	2.6
11	Self-esteem	1	2.6
12	Quality	1	2.6
13	Standardisation	1	2.6
14	Risk-taking	1	2.6
15	Competition	1	2.6
16	Growth	1	2.6
17	Innovation	1	2.6
18	Turnover	1	2.6
19	Employee Involvement	1	2.6

### **2.3. Appropriate Criteria for OE Assessment of Seaport Organisations at Output Phase of the System-Based Model**

This section addresses the statistical analysis related to hypothesised OE criteria at the Output phase of the hypothetical model (i.e. Productivity, Quality, Profitability, Goal attainment, Efficiency, Growth, Stability, Turnover, Customer satisfaction, and Employee satisfaction).

Each criterion related to the Output phase of the system-based model was assessed using a categorical scale with the following dimensions:

1. Yes;
2. No/Input;
3. No/Transformation;
4. No/Attribute; and
5. No/Not OE.

The analyses and presentation of related data was carried out in three ways. Firstly, measures of reliability and validity (Cronbach's alpha and principal component factor analysis) will be discussed to test the reliability and validity of collected data. Secondly, descriptive statistics will be used to get a feel for the data. Thirdly, appropriate statistical techniques will be conducted to test the hypotheses. All results, tables and charts using Output criteria were derived from answers to related questions in the survey instrument.

### 2.3.1. Internal Consistency and Validity of Data at Output Phase

The scales of 10 OE criteria at Output phase were subjected to inter-item consistency reliability (Cronbach's alpha reliability coefficient) and factor analysis. The results showed that the Cronbach's alpha score ( $\alpha$ ) for the all variables of Output Phase was at an acceptable level of 0.7746 and factor loadings were all above .5 (Table 8.13), indicating that they measured the same underlying construct (i.e. Output).

**Table 8.13: Internal Consistency (Cronbach's alpha reliability coefficient) and Validity Analyses of Output Phase Items**

	Corrected Item-Total Correlation	Alpha if Item Deleted	Factor Loadings*	N of Cases	Alpha Score
Productivity	0.4796	0.7525	0.684	180	0.7746
Quality	0.4230	0.7581	0.809		
Profitability	0.5157	0.7450	0.622		
Turnover	0.4710	0.7525	0.688		
Goal Attainment	0.4139	0.7590	0.559		
Efficiency	0.3940	0.7613	0.692		
Growth	0.4733	0.7523	0.753		
Stability	0.4385	0.7588	0.796		
Customer Satisfaction	0.3266	0.7689	0.569		
Employee Satisfaction	0.5087	0.7464	0.505		

\*Rotation Method: Varimax with Kaiser Normalisation



### 2.3.2. Description of Output Phase Data

All tables and graphs (suitable for descriptive analysis) related to Output criteria are illustrated in Appendix 14 and only discussions are presented here. Therefore, this section only reports a summary of the PSO managers' responses to each criterion of the Output phase of the proposed model in terms of frequency of occurrence and percentage.

**Productivity:** The bar and pie charts (Figure 1, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Productivity criterion respectively. As can be seen from these charts and Table 1 (Appendix 14), a very high number of PSO managers (157 or 87.2 per cent) approved that Productivity is firstly a correct measure of OE for seaport organisations and secondly a correct measure at the Output phase of the system-based model, while only 23 managers (12.8 per cent) believed that it either belongs to other phases or not an OE measure at all.

When the four negative responses of the Productivity criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 1 and Figure 2, Appendix 14), it was noted that, of the 23 managers who disagreed with the assumption that Productivity is a correct measure of OE at Output phase, more than half of them (56.5 per cent) believed that this criterion belongs to Attribute (i.e. it is a common measure of OE across all three phases of a system).

**Quality:** The bar and pie charts (Figure 3, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of this criterion respectively. As it is evident from these charts and Table 2 (Appendix 14), most of PSO managers (155 or 86.1 per cent) trusted that Quality is a correct measure of OE for seaport organisations as well as being a correct criterion at the Output phase of the system-based model, while 13.9 per cent of managers believed that it is either not a measure of OE at all or it belongs to other phases of the system-based model.

A separate evaluation of the four categories of negative responses of the Quality (last column of Table 2 and Figure 4, Appendix 14) made it clear that, of the 25 managers who were against the proposal, 68.0 per cent declared that the Quality is a common OE

criterion across all phases of a system, while minority of 16.0 per cent did not accept it as a correct measure of OE in seaport organisation.

**Profitability:** The bar and pie charts (Figure 5, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Profitability criterion respectively. As can be seen from these charts and Table 3 (Appendix 14), a high percentage of PSO managers (77.8 per cent or 140 managers) were in favour of Profitability being a correct measure of OE for seaport organisations as well as a correct criterion at the Output phase of the system-based model. Consequently, only 22.2 per cent believed that it belongs to other phases of the system, while 13 managers (7.2 per cent) were totally against the issue.

Examining the four frequencies of negative responses of the Profitability criterion separately (last column of Table 3 and Figure 6, Appendix 14) revealed that, of the 40 managers who responded negatively, 42.5 per cent of them believed that Professionalism is a common criterion across all phases of the model and should be treated as an Attribute criterion, 25.0 per cent considered it as a Transformation phase criterion, and 32.5 per cent were totally against the criterion being a correct measure of OE.

**Turnover:** The bar and pie charts (Figure 7, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Turnover criterion respectively. As it is apparent from these charts and Table 4 (Appendix 14), of the 180 PSO managers, 147 managers (81.7 per cent) agreed that Turnover is firstly a correct indicator of OE in seaport organisations and secondly it is a correct criterion at the Output phase of the proposed model, and the remainder (33 managers or 18.3 per cent) believed it should either be clustered to other phases of the model or to be completely dropped from the model.

Inspection of the Turnover's negative responses separately (last column of Table 4 and Figure 8, Appendix 14) showed that more than half of them (57.6 per cent) declared that the Turnover is a common OE criterion across all phases of a system, while a minority of 9.1 per cent did not accept it as a correct measure of OE in seaport organisations.

**Goal Attainment:** The bar and pie charts (Figure 9, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Goal Attainment criterion respectively. These charts along with Table 5 (Appendix 14) show that slightly above 80.0 per cent of PSO managers responded positively to Goal attainment as an appropriate criterion for assessing OE in seaport organisations in addition to being a correct criterion at the Output phase of the model, while only less than 20.0 per cent were against these suggestions.

When the four negative responses of the Goal Attainment criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 5 and Figure 10, Appendix 14), it was found that, of the 35 managers who disagreed with the assumption that Goal Attainment is a correct measure of OE at Output phase, about half of them (51.4 per cent) believed that Goal Attainment should be treated as a common measure of OE across all three phases of a system,

**Efficiency:** The bar and pie charts (Figure 11, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of this criterion respectively. As can be seen from these graphs and Table 6 (Appendix 14), again above 80.0 per cent of PSO managers (or 145 managers) agreed that Efficiency is both a correct measure of OE in seaport organisations and a correct criterion at the Output phase of the system-based model.

When the remaining 19.4 per cent (or 35 managers) with negative responses were checked separately (last column of Table 6 and Figure 12, Appendix 14), unlike the previous results, 37.1 per cent of managers believed that Efficiency is a correct measure of OE at Transformation phase, and a lesser percentage (31.4 per cent) considered it as a common criterion across all phases of the system-based model (i.e. Attribute).

**Growth:** The bar and pie charts (Figure 13, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Growth criterion respectively. As can be seen from these charts and the Table 7 (Appendix 14), just below 60.0 per cent of PSO managers (105 managers) approved that Growth is firstly a correct measure of OE and secondly a correct measure at the Output phase of the

system-based model, while 75 managers (41.7 per cent) believed that it either belongs to other phases or not an OE measure at all.

When the four negative responses of the Growth criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 7 and Figure 14, Appendix 14), it was noted that, of the 75 managers who disagreed with the assumption that Growth is a correct measure of OE at Output phase, less than half of them (48.0 per cent) believed that this criterion belongs to Attribute (i.e. it is a common measure of OE across all three phases of a system), while 21.3 (or 16 managers) did not accept the Growth as a correct measure of OE in seaport organisations.

**Stability:** The bar and pie charts (Figure 15, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Stability criterion respectively. As it is apparent from these charts and Table 8 (Appendix 14), of the 180 PSO managers, 106 managers (58.9 per cent) agreed that Stability is firstly a correct indicator of OE in seaport organisations and secondly it is a correct criterion at the Output phase of the proposed model, and the remainder (74 managers or 41.1 per cent) believed it should either be clustered to other phases of the model or to be completely dropped from the model.

Inspection of the negative responses of the Stability criterion separately (last column of Table 2 and Figure 16, Appendix 14) showed that, of the 74 managers who responded negatively, majority of them (35.1 per cent) believed that Stability is not a correct measure of OE at all, while 27.0, 21.6, and 16.2 per cent believed that the Stability criterion to be clustered to Attribute, Transformation, and Input phases respectively.

**Customer Satisfaction:** The bar and pie charts (Figure 17, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Customer Satisfaction criterion respectively. These charts along with Table 9 (Appendix 14) show that a very high majority of PSO managers (156 managers or 86.7 per cent) responded positively to Customer Satisfaction as an appropriate criterion for assessing OE in seaport organisations in addition to being a correct criterion at the Output phase of the model, while only about 13.3 per cent were against these suggestions.

A separate evaluation of the four categories of negative responses of the Customer Satisfaction (last column of Table 9 and Figure 18, Appendix 14) made it clear that, of the 24 managers who were against the proposal, less than half of them (45.8 per cent) declared that the Customer Satisfaction is a common OE criterion across all phases of a system and should be treated as an Attribute criterion, while about one-third of them (29.2 per cent) were totally against the criterion.

**Employee Satisfaction:** The bar and pie charts (Figure 19, Appendix 14) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Employee Satisfaction criterion respectively. These charts along with Table 10 (Appendix 14) show that about 75 per cent of PSO managers (or 135 managers) agreed that Employee Satisfaction is firstly a correct indicator of OE in seaport organisations and secondly it is a correct criterion at the Output phase of the proposed model, and the remainder (45 managers or 25.0 per cent) believed it should either be clustered to other phases of the model or to be completely dropped from the model.

When the four negative responses of the Employee Satisfaction criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 10 and Figure 20, Appendix 14), it was revealed that, of the 45 managers who disagreed with the assumption that Employee Satisfaction is a correct measure of OE at the Output phase, more than half of them (55.6 per cent) believed that Employee Satisfaction should be treated as a common measure of OE across all three phases of a system.

### **2.3.3. One-Sample Tests for Goodness-of-Fit of Output Criteria (5 Categories)**

In order to determine whether statistical significant difference(s) existed among 5 different frequencies of responses, each of the 10 variables of the Output phase of the system-based model was subjected to two one-sample tests; namely a Chi-square test and a Kolmogorov-Smirnov test, the results of which are shown in Table 8.14.

**Table 8.14: The Result of One-Sample Tests of Output Phase Criteria (5 Categories)**

	Chi-square ( $\chi^2$ )*			Kolmogorov-Smirnov*	
	Value	df	P	Z value	p
<b>Productivity</b>	510.556	4	.000	6.919	.000
<b>Quality</b>	496.111	4	.000	6.877	.000
<b>Profitability</b>	267.956	3	.000	6.359	.000
<b>Turnover</b>	432.333	4	.000	6.565	.000
<b>Goal Attainment</b>	416.500	4	.000	6.491	.000
<b>Efficiency</b>	413.778	4	.000	6.441	.000
<b>Growth</b>	177.833	4	.000	4.908	.000
<b>Stability</b>	173.111	4	.000	4.837	.000
<b>Customer Satisfaction</b>	365.378	3	.000	6.898	.000
<b>Employee Satisfaction</b>	347.333	4	.000	6.095	.000

\*  $\alpha < 0.05$ 

As can be seen from the above table, both Chi-square and Kolmogorov-Smirnov tests for goodness-of-fit revealed significant differences between the frequencies of five response categories of all variables. That is, both tests yielded a  $p$  value of .000 ( $p < 0.05$ ) for all variables. Inspection of the data related to these variables revealed that these differences were mainly between positive responses (Yes scores) and all other four negative responses (No scores).

#### **2.3.4. Binomial Test for Binary Categories of Output Criteria (2 Categories)**

In order to use the Binomial test, the five response categories of the Output criteria had to be converted into binary categories. Therefore, four negative response categories (i.e. No/Input, No/Transformation, No/Attribute, and No/Not OE) of each variable were collapsed into one category signifying negative responses, while preserving the original positive responses (i.e. Yes). Subsequently, the binary categories of each Input variable (reflecting the 'Total' column of Tables 1 to 10 and Figures 1.b., 3.b., 5.b., 7.b., 9.b., 11.b., 13.b., 15.b., 17.b. and 19.b. of Appendix 14) were put through a Binomial test for comparing the positive and negative responses, the results of which are tabulated in Table 8.15.

**Table 8.15: The Result of Binomial Test of Output Phase Criteria (2 Categories)**

	Category	Observed Prop.	Binomial Test*	
			Test Prop.	<i>p</i> **
Productivity	Yes	.9	.5	.000
	No	.1		
Quality	Yes	.9	.5	.000
	No	.1		
Profitability	Yes	.8	.5	.003
	No	.2		
Turnover	Yes	.8	.5	.001
	No	.2		
Goal Attainment	Yes	.8	.5	.005
	No	.2		
Efficiency	Yes	.8	.5	.004
	No	.2		
Growth	Yes	.6	.5	.031
	No	.4		
Stability	Yes	.6	.5	.021
	No	.4		
Customer Satisfaction	Yes	.9	.5	.000
	No	.1		
Employee Satisfaction	Yes	.7	.5	.013
	No	.3		

\* $\alpha < 0.05$ 

\*\*Based on Z approximation

As it is evident from the above table, the Binomial test of comparing positive and negative responses to Productivity, Quality, Profitability, Goal attainment, Efficiency, Growth, Stability, Turnover, Customer satisfaction, and Employee satisfaction variables revealed that the *p* value associated with these comparisons were .000, .000, .003, .001, .005, .004, .031, .021, .000, and .013 ( $p < 0.05$ ) respectively, indicating that the number of positive and negative responses of each criterion did differ significantly from the binomial assumption of equal probability. These differences were mainly caused by the higher observed proportion of positive responses of all variables compared to those of negative responses.

### 2.3.5. One-Sample Test for Negative Responses of Output Criteria (4 Categories)

The negative responses (i.e. No/Input, No/Transformation, No/Attribute, and No/Not OE) of each Output variable were subjected to a one-sample chi-square test to examine

the even/uneven spread among negative responses (Nos). The results of this test are illustrated in Table 8.16—reflecting the last column of Tables 1 to 10, Appendix 14.

**Table 8.16: The Result of One-Sample Test for Negative Responses of Output Phase Criteria (4 Categories)**

	Chi-square ( $\chi^2$ )		
	Value	df	P
Productivity	13.696	3	.003
Quality	25.400	3	.000
Profitability	1.850	2	.397
Turnover	19.727	3	.000
Goal Attainment	16.314	3	.001
Efficiency	5.114	3	.164
Growth	24.040	3	.000
Stability	5.784	3	.123
Customer Satisfaction	1.750	2	.417
Employee Satisfaction	22.467	3	.000

The one-sample Chi-square test found significant differences among the frequencies of negative responses of Productivity, Quality, Turnover, Goal Attainment, Growth, and Employee Satisfaction criteria. The Chi-Square values of these 6 variables, with 3 degrees of freedom, had very small significant levels ranging from .000 to .003 ( $p < 0.05$ ), which demonstrated that the breakdown of negative responses deviated substantially from the expected values (equal frequency of each response category). The differences were predominantly between Attribute and all other negative categories (Input, Transformation, and Not OE). However, the test could not reveal any significant difference between the frequencies of negative responses of Profitability, Efficiency, Stability, and Customer Satisfaction variables. Large  $p$  value ( $p > 0.05$ ) associated with these variables was an indication of even spreads between the frequencies of negative responses.

### 2.3.6. Group Test of Output Criteria for Success and Failure

In addition to the preceding sections in which each criterion was independently and separately subjected to different statistical tests, this section deals with a condition where all 10 criteria of the Output phase of the system-based model (binary categories) were collectively subjected to ‘Cochran’s  $Q$  test for  $k$  related samples’ to firstly compare the responses, and secondly to test whether there was a significant difference



in the responses (Yes and No, or Success and Failure) of respondents at the Output phase. The result of this test is shown in Table 8.17.

Table 8.17: The Result of Cochran’s *Q* Test of Output Phase Criteria

	Frequency		Cochran’s <i>Q</i>	df	<i>p</i>
	1=Yes	2=No			
Productivity	157	23	132.144*	9	.000
Quality	155	25			
Profitability	140	40			
Turnover	147	33			
Goal Attainment	145	35			
Efficiency	145	35			
Growth	105	75			
Stability	106	74			
Customer Satisfaction	156	24			
Employee Satisfaction	135	45			

\*1 is treated as a success

As can be seen from above table, the Cochran’s *Q* test revealed significant difference when all 10 Output variables were compared. The *Q* value of 132.144 was significant at .000 ( $p<0.05$ ), indicating that the positive category of responses in all 10 variables was treated as an absolute success.

2.3.7. Respondents’ Inputs in Output Phase of the System-Based OE Model

As each respondent had the chance of proposing additional criteria to be added to the hypothetical list of OE measures at the Output phase of the system-based model, this section describes the valid suggestions provided by respondents. Broadly speaking, the number of PSO managers who expressed their opinion was relatively low and might not affect the overall result of the survey, however from the research ethics point of view, they are all reported below.

Of the 164 PSO managers (out of 180) who responded to the relevant question, 147 (89.6 per cent) did not have any specific suggestion at all, and the remaining 17 (10.4 per cent) managers have given a wide variety of responses, which are listed in Table 8.18 with their associated frequencies and percentages in a descending order.

Table 8.18: PSO Managers’ Criteria Suggestions for Inclusion in Output Phase

No.	OE Criteria	Frequency	%
1	Competition	5	25.0
2	HR Development	4	20.0
3	Evaluation	4	20.0
4	Information Management & Communication	2	10.0
5	Morale	2	10.0
6	Human Behaviour	1	5.0
7	Standardisation	1	5.0
8	Employee Involvement	1	5.0

As can be noted from Table 8.18, a total of 8 criteria were suggested by PSO managers for inclusion in the Output phase of the proposed model, with Competition suggested by 5 managers being on top of the list and so on.

2.4. Common Criteria for OE Assessment of Seaport Organisations Across all Phases of the System-Based Model (Attributes)

This section addresses the statistical analysis related to the proposed common OE criteria across all three phases of the hypothetical model (i.e. Adaptability, Flexibility, Cohesion, Morale, Organisation’s Worth, and HR Development).

Each criterion related to Attributes of the system-based model was assessed using a categorical scale with the following dimensions:

- 1. Yes;
- 2. No/Input;
- 3. No/Transformation;
- 4. No/Output;
- 5. No/Not OE;
- 6. No/Input & Transformation (I & T);
- 7. No/Input & Output (I & O); and
- 8. No/Transformation & Output (T & O).

The analyses and presentation of related data was carried out in three ways. Firstly, measures of reliability and validity (Cronbach’s alpha and principal component factor analysis) will be discussed to test the reliability and validity of collected data. Secondly, descriptive statistics will be used to get a feel for the data. Thirdly, appropriate statistical techniques will be conducted to test the hypotheses. All results, tables and charts using Attributes were derived from answers to related questions in the survey instrument.

2.4.1. Internal Consistency and Validity of Attributes Data

The scales of 6 variables of OE model Attributes were subjected to inter-item consistency reliability (Cronbach’s alpha reliability coefficient) and factor analysis. The results indicated that the Cronbach’s alpha score ( $\alpha$ ) for the all Attributes was at an acceptable level of 0.7103 and factor loadings were all above .5 (Table 8.19), proving that they measured the same underlying construct (i.e. Attributes).

Table 8.19: Internal Consistency (Cronbach’s alpha reliability coefficient) and Validity Analyses of OE Attributes

	Corrected Item-Total Correlation	Alpha if Item Deleted	Factor Loadings*	N of Cases	Alpha Score
Adaptability	.4218	.6774	0.632	180	0.7103
Flexibility	.4362	.6731	0.629		
Cohesion	.5350	.6471	0.735		
Morale	.4154	.6796	0.623		
Organisation’s worth	.4091	.6822	0.593		
HR Development	.4557	.6686	0.640		

\*Rotation Method: Varimax with Kaiser Normalisation

2.4.2. Description of Attributes Data

All tabular and graphical presentations (suitable for descriptive analysis) related to OE Attributes are illustrated in Appendix 15 and only discussions are presented here. Therefore, this section aims to summarise the PSO managers’ responses to each OE Attribute of the proposed model in terms of frequency of occurrence and percentage.

**Adaptability:** The bar and pie charts (Figure 1, Appendix 15) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of this criterion respectively. As can be seen from these charts and the Table 1 (Appendix 15), high majority of PSO managers (154 or 85.6 per cent) approved that Adaptability is firstly a correct measure of OE and secondly a correct OE Attribute of the system-based model, while only 26 managers (14.4 per cent) believed that it either belongs to other phases or not an OE measure at all.

When the seven negative responses of the Adaptability criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 1 and Figure 2, Appendix 15), it was noted that, of the 26 managers who disagreed with the assumption that Adaptability is a correct OE Attribute, a maximum of 38.5 per cent of managers believed that this criterion belongs to only Transformation phase, and 19.2 per cent did not accept this variable as an OE criterion at all.

**Flexibility:** The bar and pie charts (Figure 3, Appendix 15) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Flexibility criterion respectively. As it is evident from these charts and Table 2 (Appendix 15), majority of PSO managers (151 or 83.9 per cent) trusted that Flexibility is a correct measure of OE for seaport organisations as well as being a correct OE Attribute of the system-based model, while only a minority of 16.1 per cent of managers believed that it is either not a measure of OE at all or it belongs to other phases of the system-based model.

A separate evaluation of the seven categories of negative responses of the Flexibility (last column of Table 2 and Figure 4, Appendix 15) made it clear that, of the 29 managers who were against the proposal, about one-fourth of them (24.1 per cent) declared that the Flexibility is a correct measure of OE at Transformation phase, while 20.7 per cent did not accept it as a correct measure of OE in seaport organisation.

**Cohesion:** The bar and pie charts (Figure 5, Appendix 15) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Cohesion criterion respectively. As can be seen from these charts and Table 3 (Appendix 15), very

high percentage of PSO managers (88.9 per cent or 160 managers) were in favour of the Cohesion being a correct measure of OE for seaport organisations as well as a correct OE Attribute for the system-based model. Consequently, 11.1 per cent believed that it belongs to other phases of the system, while only one manager (0.6 per cent) was totally against the issue.

Examining the seven frequencies of negative responses of the Cohesion criterion separately (last column of Table 3 and Figure 6, Appendix 15) revealed that, of the 20 managers who responded negatively, majority of 30.0 per cent believed that Cohesion is an Output criterion rather than an OE Attribute, while 25.0 and 20.0 per cent believed that it should be clustered to the Input and Transformation phases respectively.

**Morale:** The bar and pie charts (Figure 7, Appendix 15) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Morale criterion respectively. As it is apparent from these charts and Table 4 (Appendix 15), of the 180 PSO managers, 159 managers (88.3 per cent) agreed that Morale is firstly a correct indicator of OE in seaport organisations and secondly it is a correct OE Attribute for the proposed model, and the remainder (21 managers or 11.7 per cent) believed it should either be clustered to other phases of the model or be completely dropped from the model.

Inspection of the Morale's negative responses separately (last column of Table 4 and Figure 8, Appendix 15) showed a moderate spread of frequency across the seven response categories, with 38.1 per cent believed this criterion belongs to Input phase, 9.5 per cent to Transformation phase, and 14.3 per cent to Output, while 14.3 per cent were totally against the proposal that Morale is a correct measure of OE in seaport organisations.

**Organisation's Worth:** The bar and pie charts (Figure 9, Appendix 15) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of the Organisation's Worth criterion respectively. These charts, along with Table 5 (Appendix 15), show that about 83 per cent of PSO managers have responded positively to the Human Behaviour as an appropriate criterion for assessing OE in seaport

organisations in addition to being a correct OE Attribute for the model, while only about 17 per cent were against these suggestions.

When the seven negative responses of the Organisation's Worth criterion were assessed separately to determine if any significant differences existed among their frequencies of responses (last column of Table 5 and Figure 10, Appendix 15), it was found that, of the 31 managers who disagreed with the assumption that Human Behaviour is a correct OE Attribute, about one-third of them (29.0 per cent) believed that Organisation's Worth should be treated as an Input criterion, 16.1 per cent as a Transformation criterion, 25.8 per cent as an Output criterion, while 16.1 per cent were totally against the proposal that Organisation's Worth is a correct measure of OE in seaport organisations.

**HR Development:** The bar and pie charts (Figure 11, Appendix 15) illustrate the spread of overall responses (5 categories) and binary responses (2 categories) of this criterion respectively. As can be seen from these graphs and Table 6 (Appendix 15), an acceptable percentage of PSO managers (78.3 per cent or 141 managers) agreed that HR Development is both a correct measure of OE in seaport organisations and a correct OE Attribute for the system-based model.

When the remaining 21.7 per cent (or 39 managers) with negative responses were checked separately (last column of Table 6 and Figure 12, Appendix 15), it was found that, of the 39 PSO managers who responded negatively, 38.5 per cent of them believed this criterion belongs to Input phase, 12.8 per cent to Transformation phase, and 17.9 per cent to Output, while 15.4 per cent were totally against the proposal that HR Development is a correct measure of OE in seaport organisations at all.

### 2.4.3. One-Sample Tests for Goodness-of-Fit of OE Attributes (8 Categories)

In order to determine whether statistical significant difference(s) existed among 8 different frequencies of responses, each of the six OE Attributes of the system-based model was subjected to two one-sample tests; namely a Chi-square test and a Kolmogorov-Smirnov test, the results of which are shown in Table 8.20.

**Table 8.20: The Result of One-Sample Tests of OE Attributes (8 Categories)**

	Chi-square ( $\chi^2$ )*			Kolmogorov-Smirnov*	
	Value	df	P	Z value	p
<b>Adaptability</b>	748.667	6	.000	6.639	.000
<b>Flexibility</b>	839.733	7	.000	6.500	.000
<b>Cohesion</b>	676.467	5	.000	6.849	.000
<b>Morale</b>	807.156	6	.000	6.728	.000
<b>Organisation's worth</b>	691.344	6	.000	6.418	.000
<b>HR Development</b>	719.289	7	.000	6.024	.000

\*  $\alpha < 0.05$ 

As can be seen from the above table, both Chi-square and Kolmogorov-Smirnov tests for goodness-of-fit revealed significant differences between the frequencies of eight response categories of all variables. That is, both tests yielded a  $p$  value of .000 ( $p < 0.05$ ) for all variables. Inspection of the data related to these variables revealed that these differences were predominantly between positive responses (Yes scores) and all other seven negative responses (No scores).

#### **2.4.4. Binomial Test for Binary Categories of OE Attributes (2 Categories)**

For a Binomial test to be applicable, the eight response categories of the OE Attributes had to be converted into binary categories. Therefore, seven negative response categories (i.e. No/Input, No/Transformation, No/Output, No/Not OE, No/I & T, No/I & O, and No/T & O) of each variable were collapsed into one category signifying negative responses, while preserving the original positive responses (i.e. Yes). Subsequently, the binary categories of each Input variable (reflecting the 'Total' column of Tables 1 to 6 and Figures 1.b., 3.b., 5.b., 7.b., 9.b. and 11.b. of Appendix 15) were put through a Binomial test for comparing the positive and negative responses, the results of which are tabulated in Table 8.21.

As it is evident from the table, the Binomial test of comparing positive and negative responses to Adaptability, Flexibility, Cohesion, Morale, Organisation's Worth, and HR Development variables revealed that the  $p$  value associated with these comparisons were .000, .001, .002, .000, .006 and .009 ( $p < 0.05$ ) respectively, indicating that the

number of positive and negative responses of each criterion did differ significantly from the binomial assumption of equal probability. These differences were mainly caused by the higher observed proportion of positive responses of all variables compared to those of negative responses (4 times higher).

Table 8.21: The Result of Binomial Test of OE Attributes (2 Categories)

	Category	Observed Prop.	Binomial Test*	
			Test Prop.	P**
Adaptability	Yes	.9	.5	.000
	No	.1		
Flexibility	Yes	.8	.5	.001
	No	.2		
Cohesion	Yes	.9	.5	.002
	No	.1		
Morale	Yes	.9	.5	.000
	No	.1		
Organisation's worth	Yes	.8	.5	.006
	No	.2		
HR Development	Yes	.8	.5	.009
	No	.2		

\* $\alpha < 0.05$   
\*\*Based on Z approximation

2.4.5. One-Sample Test for Negative Responses of OE Attributes (7 Categories)

The negative responses (i.e. No/Input, No/Transformation, No/Output, No/Not OE, No/I & T, No/I & O, and No/T & O) of each OE Attribute were subjected to a one-sample chi-square test to examine the even/uneven spread among negative responses (Nos). The results of this test are illustrated in Table 8.22—reflecting the last column of Tables 1 to 6, Appendix 15.

Table 8.22: The Result of One-Sample Test for Negative Responses of OE Attributes (7 Categories)

	Chi-square ( $\chi^2$ )		
	Value	df	P
Adaptability	11.846	5	.037
Flexibility	5.517	6	.479
Cohesion	3.500	4	.478
Morale	8.429	5	.134
Organisation's worth	8.677	5	.123
HR Development	24.359	6	.000



The one-sample Chi-square test found significant differences among the frequencies of negative responses of HR Development criterion. The Chi-Square value of 24.359, with 6 degrees of freedom, had very small significant level of .000 ( $p < 0.05$ ), which demonstrated that the breakdown of negative responses of HR Development deviated substantially from the expected values (equal frequency of each response category). The differences were predominantly between Input phase and all other negative categories (Transformation, Output, Not OE, I & T, I & O, and T & O).

The Chi-square test also revealed significant differences among the frequencies of negative responses of Adaptability criterion (.037,  $p < 0.05$ ), but more than 20 per cent of the cells had an expected count of less than 5 making the chi-square figure suspect. Further, the test could not reveal any significant difference between the frequencies of negative responses of Flexibility, Cohesion, Morale, and Organisation's Worth variables. Large  $p$  value ( $p > 0.05$ ) associated with these variables was an indication of even spreads between the frequencies of negative responses.

#### 2.4.6. Group Test of OE Attributes for Success and Failure

In addition to the preceding sections in which each criterion was independently and separately exposed to different statistical tests, this section addresses a condition where all six OE Attributes of the system-based model (binary categories) were collectively subjected to 'Cochran's  $Q$  test for  $k$  related samples' to firstly compare the responses, and secondly to test whether there was a significant difference in the responses (Yes and No, or Success and Failure) of respondents to the OE Attributes. The result of this test is shown in Table 8.23.

**Table 8.23: The Result of Cochran's  $Q$  Test of OE Attributes**

	Frequency		Cochran's $Q$	df	$p$
	1=Yes	2=No			
Adaptability	154	26	14.781*	5	.011
Flexibility	151	29			
Cohesion	160	20			
Morale	159	21			
Organisation's worth	149	31			
HR Development	141	39			

\*1 is treated as a success

As can be seen from above table, the Cochran's  $Q$  test revealed significant difference when all six OE Attributes were compared. The  $Q$  value of 14.781 was significant at .011 ( $p < 0.05$ ), indicating that the positive category of responses in all six variables was treated as a success.

#### 2.4.7. Respondents' Inputs to OE Attributes of the System-Based OE Model

As each respondent had the chance of proposing additional criteria to be added to the hypothetical list of OE Attributes for the system-based model, this section describes the valid suggestions provided by respondents. Broadly speaking, the number of PSO managers who expressed their opinion was relatively low and might not affect the overall result of the survey, however from the research ethics point of view, they are all reported below.

Of the 175 PSO managers (out of 180) who responded to the relevant question, 154 (88.0 per cent) did not have any specific suggestion at all, and the remaining 21 (12.0 per cent) managers have given a wide variety of responses, which are listed in Table 8.24 with their associated frequencies and percentages in a descending order.

**Table 8.24: PSO Managers' Criteria Suggestions for Inclusion in OE Attributes**

No.	OE Criteria	Frequency	%
1	Planning	5	16.7
2	Innovation	4	13.3
3	Evaluation	4	13.3
4	Human Behaviour	3	10.0
5	Employee Satisfaction	3	10.0
6	Professionalism	2	6.7
7	Resource Acquisition	2	6.7
8	Stability	2	6.7
9	Customer Satisfaction	1	3.3
10	Organisational Discipline	1	3.3
11	Profitability	1	3.3
12	Autonomy	1	3.3
13	Risk-taking	1	3.3

As can be noted from Table 8.24, a total of 13 criteria were suggested by PSO managers for inclusion in the list of OE Attributes of the proposed model, with Planning suggested by 5 managers being on top of the list and so on.

### 3. Summary

This chapter was confined to presentation and analysis of the collected data from the questionnaire survey as they related to third research question and hypothesis:

**Q3.** How the effectiveness of seaport organisations can be measured? What are the appropriate criteria for measuring OE of Iran's seaports' organisation?

**H3.** The correct criteria for assessing OE in seaport organisations can be identified and grouped into a meaningful system-based model comprising an Input phase, a Transformation phase, an Output phase and OE attributes (common criteria).

The chapter presented and analysed the data in three ways. Firstly, measures of reliability and validity (Cronbach's alpha and principal component factor analysis) were used to test the reliability and validity of collected data. Secondly, descriptive statistics were utilised to get a feel for the data. Thirdly, appropriate statistical techniques were conducted to test the hypotheses.

Subsequent to reliability and validity (Cronbach's alpha and principal component factor analysis) analyses of criteria in each phase of the proposed OE model, each criterion in the model was descriptively analysed and statistically examined (individually and in groups) with respect to the results of the survey.

As a result of reliability and validity analyses, 'External Support' and 'Resource Acquisition' criteria of the Input phase and 'Conformity' criterion of the Transformation phase were eliminated from the hypothetical OE model, as they did not prove to be reliable and valid measures of OE in seaport organisations. The remaining 25 criteria were subjected to several statistical tests suitable for multi-dichotomous and dichotomous (binary) data, the results of which are summarised below:

### 1. Input

- There were significant statistical differences between the frequencies of five response categories of all Input variables. The differences were mainly between positive responses (Yes scores) and all other four negative responses (No scores);
- The test for binary categories of Input criteria showed that the number of positive and negative responses of each criterion did differ significantly from the binomial assumption of equal probability. These differences were mainly caused by the higher observed proportion of positive responses of all variables compared to those of negative responses;
- There were also significant statistical differences among the frequencies of negative responses of all six Input criteria. The difference was predominantly between Attribute and all other negative categories (Transformation, Output, and Not OE).
- There existed significant statistical differences when all six Input variables were compared by a group test for success and failure, which indicated that the positive category of responses in all six variables was treated as a success.

### 2. Transformation:

- There were significant statistical differences between the frequencies of five response categories of all three variables of Transformation phase. These differences were mainly between positive responses (Yes scores) and all other four negative responses (No scores).
- The test for binary categories of Transformation criteria showed that the number of positive and negative responses of each criterion differed significantly from the binomial assumption of equal probability. These differences were mainly caused by the higher observed proportion of positive responses of all variables compared to those of negative responses.
- There were also significant statistical differences between the frequencies of negative responses of all three Transformation criteria. The difference was mainly between Attribute and all other negative categories (Input, Output, and Not OE).
- No statistically significant differences could be revealed when all three Transformation variables were compared by a group test for success and

failure, which indicated that all three variables being treated almost the same by all respondents, with the positive category of responses still being a success.

### **3. Output:**

- There were statistically significant differences between the frequencies of five response categories of all 10 Output variables. The differences were mainly between positive responses (Yes scores) and all other four negative responses (No scores).
- The test for binary categories of Transformation criteria showed that the number of positive and negative responses of each criterion did differ significantly from the binomial assumption of equal probability. These differences were mainly caused by the higher observed proportion of positive responses of all variables compared to those of negative responses.
- There were also statistically significant differences among the frequencies of negative responses of Productivity, Quality, Turnover, Goal Attainment, Growth and Employee Satisfaction criteria. Again, the differences were predominantly between Attribute and all other negative categories (Input, Transformation, and Not OE). However, there were no significant statistical differences between the frequencies of negative responses of Profitability, Efficiency, Stability, and Customer Satisfaction variables, which was an indication of even spreads between the frequencies of negative responses.
- Statistically significant differences also existed when all 10 Output variables were compared by a group test for success and failure, which indicated that the positive category of responses in all 10 variables was treated as an absolute success.

### **4. Attributes:**

- There were significant statistical differences between the frequencies of eight response categories of all variables. These differences were predominantly between positive responses (Yes scores) and all other seven negative responses (No scores).
- The test for binary categories of OE Attributes indicated that the number of positive and negative responses of each criterion differed significantly from

the binomial assumption of equal probability. These differences were mainly caused by the higher observed proportion of positive responses of all variables compared to those of negative responses.

- There were statistically significant differences among the frequencies of negative responses of HR Development criterion. The differences were predominantly between Input phase and all other negative categories (Transformation, Output, Not OE, I & T, I & O, and T & O). However, no statistically significant differences could be found between the frequencies of negative responses of Flexibility, Cohesion, Morale, and Organisation's Worth variables, which was an indication of even spreads between the frequencies of negative responses.
- Statistically significant differences also existed when all six OE Attributes were compared by a group test for success and failure, which indicated that the positive category of responses in all six variables was treated as a success.

The overall statistical results of the data as they related to the third research question and hypothesis (discussed above) are summarised in Table 8.25.

Table 8.25: Summary of the Statistical Analysis Results of the Third Research Question and Hypothesis

		Statistical Significant Difference(s) of Goodness-of-fit Tests		Statistical Significant Difference(s) of Binomial Distribution Tests	Statistical Significant Difference(s) of Negative Responses	Group Cochran's Q Test	
		$\chi^2$	K-S			Positive Response Treated As	Statistical Significant Difference(s)
Input	Leadership	✓	✓	✓	✓	Success	✓
	Reliability	✓	✓	✓	✓		
	Professionalism	✓	✓	✓	✓		
	Autonomy	✓	✓	✓	✓		
	Human Behaviour	✓	✓	✓	✓		
	Innovation	✓	✓	✓	✓		
Transformation	Planning	✓	✓	✓	✓	Success	✗
	Evaluation	✓	✓	✓	✓		
	Info. Manag.&Comm.	✓	✓	✓	✓		
Output	Productivity	✓	✓	✓	✓	Success	✓
	Quality	✓	✓	✓	✓		
	Profitability	✓	✓	✓	✗		
	Turnover	✓	✓	✓	✓		
	Goal Attainment	✓	✓	✓	✓		
	Efficiency	✓	✓	✓	✗		
	Growth	✓	✓	✓	✓		
	Stability	✓	✓	✓	✗		
	Customer Satisfaction	✓	✓	✓	✗		
	Employee Satisfaction	✓	✓	✓	✓		
Attribute	Adaptability	✓	✓	✓	✓	Success	✓
	Flexibility	✓	✓	✓	✗		
	Cohesion	✓	✓	✓	✗		
	Morale	✓	✓	✓	✗		
	Organisation's Worth	✓	✓	✓	✗		
	HR Development	✓	✓	✓	✓		

✓=Significant

✗=Not significant

Finally, a relatively low number of PSO managers suggested some criteria to be included in different phases of the model that are summarised in Table 8.26.

**Table 8.26: PSO Managers’ Criteria Suggestions for Inclusion in Different Phases of the System-based OE Model**

Respondents’ Suggestions			
Input	Transformation	Output	Attributes
<ul style="list-style-type: none"><li>- HR Development</li><li>- Information Management &amp; Communication</li><li>- Planning</li><li>- Employee Satisfaction</li><li>- Job Security</li><li>- Organisational Worth</li><li>- Stability</li><li>- Morale</li><li>- Flexibility</li><li>- Customer Satisfaction</li><li>- Quality</li><li>- Supervision</li><li>- Organisational Discipline</li><li>- Evaluation</li><li>- Reward Management</li></ul>	<ul style="list-style-type: none"><li>- Supervision</li><li>- HR Development</li><li>- Human Behaviour</li><li>- Customer Satisfaction</li><li>- Reliability</li><li>- Leadership</li><li>- Professionalism</li><li>- External Support</li><li>- Resource Acquisition</li><li>- Employee Satisfaction</li><li>- Self-esteem</li><li>- Quality</li><li>- Standardisation</li><li>- Risk-taking</li><li>- Competition</li><li>- Growth</li><li>- Innovation</li><li>- Turnover</li><li>- Employee Involvement</li></ul>	<ul style="list-style-type: none"><li>- Competition</li><li>- HR Development</li><li>- Evaluation</li><li>- Information Management &amp; Communication</li><li>- Morale</li><li>- Human Behaviour</li><li>- Standardisation</li><li>- Employee Involvement</li></ul>	<ul style="list-style-type: none"><li>- Planning</li><li>- Innovation</li><li>- Evaluation</li><li>- Human Behaviour</li><li>- Employee Satisfaction</li><li>- Professionalism</li><li>- Resource Acquisition</li><li>- Stability</li><li>- Customer Satisfaction</li><li>- Organisational Discipline</li><li>- Profitability</li><li>- Autonomy</li><li>- Risk-taking</li></ul>

Overall, the model as proposed was considered by PSO managers in a positive light. Statistically, the model has also been shown to be a success.

The next chapter concludes this thesis by discussing the results, presenting conclusions and implications from the research, limitations and recommendations for further research.



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# Chapter 9

## Conclusion

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### 1. Introduction

As described in Chapter 1, this thesis deals with different issues of Organisational Effectiveness (OE) assessment in seaport organisations. These issues include:

- The vital role of seaports, as an element of the transportation network, in connecting the national supply chain to the global marketplace and vice versa requires more effective organisations;
- Achievement of ports' objectives (e.g. improving the quality of its services, increasing port performance,...) necessitates a systematic approach for the thorough assessment of ports organisations effectiveness;
- No empirical research on organisational effectiveness of seaport organisations in general, and Iran's PSO in particular, has taken place in Iran or elsewhere;
- No empirical study on the possible impacts of OE assessment in port organisations has taken place; and
- No empirical research on designing a model of OE, especially for port organisations, has been conducted in Iran or elsewhere.

Therefore, this study's major objective was to explore the concept of Organisational Effectiveness (OE), its impacts, and its assessment techniques in seaport organisations in general and Iran's PSO in particular. In doing so, this thesis began by delineating the possible impacts of transportation in general and the maritime industry and seaports in particular, on national development. This was discussed with particular reference to developing countries as tools of securing maritime competitive advantages (Chapter 2). It was revealed that seaports are a significant contributor to national economic

development; both by facilitating trade through the seaports and providing vital transport infrastructure that acts as a catalyst to support investment and growth in the region. Therefore, the development of seaports can be viewed as a key factor in the economic development. Improving their performance would expand the country's international market access and can lead directly to increased trade and, through this, to higher income. Finally, Chapter 2 presented an overview of Iran's maritime capacities and their national impacts.

In Chapter 3, the importance of seaport organisations and the role they play was elaborated through analysing different types of seaport management and administration. This was narrowed down to the current practices in the organisation of Iran's seaports.

The importance of organisational effectiveness, reviewing existing models of organisational effectiveness and their implications to service industry organisations were the domains of Chapter 4. An in-depth review of some existing OE models was presented. The logic behind this review was firstly to comprehend the underlying concept of OE from different point of views, and secondly to extract the OE criteria of these models and produce a menu that helps in building an appropriate model for OE assessment in seaport organisations. This review, in addition to finding a total of 78 effectiveness criteria, revealed that a systems framework (input-transformation-output) was, comparatively, the most commonly used approach for OE model-building.

These findings, along with the absence of any solid and concrete model of OE for measuring the effectiveness of seaport organisations (the gap in the literature), led to the conceptualisation of a hypothetical system-based OE model appropriate for regular assessment of effectiveness in seaport organisations (discussed in Chapter 5).

Based on the issues that surfaced during the extensive literature review (Chapters 2, 3, 4, and 5), three research questions were posed and three hypotheses were posited. In order to investigate these questions and hypotheses, appropriate research methodology and design was adopted (Chapter 6). That is, based on the focus and purpose of the study, a sequential triangulation of methods—qualitative followed by quantitative, was adopted. Firstly, this method allowed for the qualitative exploration of historical data, development of a theory, and hypothesising a model. Secondly, it allowed testing the

hypotheses and answering the research questions quantitatively. Collective questionnaire was found to be an appropriate instrument for collecting primary data from managers of Iran's PSO (in seven locations) for this research. Chapter 6 also detailed its development, method of pre-testing, and procedures in conducting the survey.

Finally, the details of statistical techniques utilised to analyse the collected data and the results obtained from these analyses were presented in Chapters 7 and 8.

This concluding chapter draws together and reviews the overall results of the data relating to the research questions and hypotheses and incorporates conclusions for each research question and hypothesis. The Chapter then discusses the implications for further research followed by limitations of the research.

## **2. Review of the Results and Conclusions**

This section will briefly review the overall results of the data analyses with the intention of drawing conclusions for each research question and hypothesis, and consequently the research problem.

### **2.1. First Research Question and Hypothesis**

**Q1.** Why should the effectiveness of a seaport organisation be assessed/measured regularly? What is the relationship between this assessment and organisation location, managers' ranks and managers' education levels?

**H1.** The result of regular assessment of OE can be used to improve seaport organisation's effectiveness, regardless of its location, managers' ranks and managers' education levels.

There were six major variables involved in answering the first research question and consequently testing the first hypothesis. These variables were first examined individually. The variables were then evaluated by PSO organisation locations, PSO



3. The reasons for regular assessment of OE in seaport organisations:

- (i) regular assessment of OE would indicate the effectiveness status of the seaport organisation;
- (ii) the result of regular OE assessment (i.e. effectiveness status) will provide a guide for further enhancement of effectiveness in seaport organisations;
- (iii) the result of regular OE assessment may provide a guide for further strategic planning of the seaport organisations; and
- (iv) the result of regular OE assessment would indicate the seaport organisation's strengths and weaknesses;

4. The effect of organisation location, managers' position titles, and managers' education levels on regular OE assessment variables:

- (i) with the exception of 'Appropriateness of System-based OE Model' variable that has a very marginal relationship with organisation location (a difference that might be due to the novelty of the model), there is no relationship between organisation location and different regular OE assessment variables. The variables are treated the same by PSO managers of all seven branches. That is, these variables are not related to any particular organisation location;
- (ii) the position title of managers does not have any specific effect on different variables of regular OE assessment. All variables are treated the same by PSO managers of different position titles. That is, these variables are independent of any particular managerial position title; and
- (iii) with the exception of 'Effectiveness Status of Port Organisations' variable that has a relationship with managerial education levels (i.e. only revealed by one test), there is no relationship between PSO managers' educational levels and different regular OE assessment variables. The variables are treated the same by PSO managers of all education levels. That is, these variables are not related to any particular educational levels;

5. Correlation among the variables of regular OE assessment:

- (i) there is a strong positive relationship between regular OE assessment and:
  - a. appropriateness of a system-based OE model;
  - b. effectiveness status of seaport organisations;
  - c. future enhancement of seaport organisations' effectiveness; and
  - d. indication of seaport organisations' strengths and weaknesses;
- (ii) there is no relationship between regular OE assessment and:

- a. future strategic planning of seaport organisations.

## 2.2. Second Research Question and Hypothesis

**Q2.** What are the possible positive impacts of improved operational performance of seaports on development, as a result of higher OE of their organisation? What is the relationship between these impacts and organisation location, managers' ranks, and managers' education levels?

**H2.** Greater seaports' operational performance, as a result of higher OE, will have positive impacts on development, regardless of their location, managers' ranks, and managers' education levels.

There were five major variables involved in answering the second research question and consequently testing the second hypothesis. These variables were first examined individually. The variables were then evaluated by PSO organisation locations, PSO managerial position titles, and PSO managers' education levels for relatedness or independency. Finally, the correlation between these variables was assessed.

The overall results of the data analysis as they relate to the second research question and hypothesis are shown in Table 9.2 (a partial reproduction of Table 7.54, Chapter 7).

**Table 9.2: Summary of the Statistical Analysis Results of the Second Research Question and Hypothesis**

	Statistical Significant Difference(s) between Frequencies of Response Categories	Statistical Significant Difference(s) between Each Variable and			Correlation between Regular OE Assessment and Resultant Variables
		Organisation Location	Managers' Position Titles	Managers' Education Levels	
<b>V1</b>	✓	✗	✗	✓	N/A
<b>V2</b>	✓	✗	✗	✗	✓
<b>V3</b>	✓	✗	✗	✗	✓
<b>V4</b>	✓	✓	✗	✗	✓
<b>V5</b>	✓	✗	✗	✗	✓

✓=Significant

✗=Not significant

V1: Higher OE, Greater OP

V2: Impacts of Greater OP on general Development

V3: Contribution of Greater OP to National Socio-economic Development

V4: Impacts of Greater OP on Share of International Transit Trade

V5: Contribution of Greater OP to Gaining Maritime Competitive Advantage

N/A: Not Applicable

The findings of this study in relation to second research question and hypothesis suggest that:

1. The impacts of seaport organisations' higher OE:
  - (i) the higher the OE of a seaport organisation, the greater would be the OP of its seaports;
  - (ii) greater OP of seaports, as a result of higher OE of their organisation, would have positive impacts on a country's development in general;
  - (iii) greater OP of seaports, as a result of higher OE of their organisation, would positively contribute to national socio-economic development;
  - (iv) greater OP of seaports, as a result of higher OE of their organisation, would achieve a higher share of international transit trade; and
  - (v) greater OP of seaports, as a result of higher OE of their organisation, would gain a maritime competitive edge in the region;
2. The effect of organisation location, managers' position titles, and managers' education levels on greater OP variables:
  - (i) with the exception of 'Impacts of Greater OP on Share of International Transit Trade' that has a relationship with organisation location, there is no relationship between organisation location and different greater OP

variables. The variables are treated the same by PSO managers of all seven branches. That is, these variables are not related to any particular organisation location;

- (ii) the position title of managers does not have any specific effect on different variables of greater OP. All variables are treated the same by PSO managers of different position titles. That is, these variables are independent of any particular managerial position title; and
- (iii) with the exception of 'Higher OE, Greater OP' variable that has a very marginal relationship with managerial education levels (i.e. only revealed by one test), there is no relationship between PSO managers' educational levels and different greater OP variables. The variables are treated the same by PSO managers of all education levels. That is, these variables are not related to any particular educational levels;

3. Correlation among the variables of greater OP:

- (i) there is a strong positive relationship between 'Greater OP as a Result of Higher OE' and:
  - a. country's development in general;
  - b. national socio-economic development;
  - c. achievement of a higher share of international transit trade; and
  - d. gaining a maritime competitive advantage in the region.

## 2.3. Third Research Question and Hypothesis

**Q3.** How can the effectiveness of seaport organisations be assessed/measured? And what are the appropriate criteria for assessing/measuring OE of Iran's seaport organisation?

**H3.** The correct criteria for assessing OE in seaport organisations can be identified and grouped into a meaningful system-based model comprising an Input phase, a Transformation phase, an Output phase and OE attributes (common criteria).

It was realised that the first essential step in the assessment of effectiveness of a seaport organisation is the identification of relevant criteria and clustering them into a model. Based on this realisation, out of 78 OE criteria (Chapter 4), a total of 28 criteria were



identified, grouped into specifically related components and clustered into a systems-based<sup>20</sup> OE model (Chapter 5). Therefore, answering the final research question involved testing the validity of criteria clustered across the various phases of a theoretical system-based OE model (i.e. conceptualised in Chapter 5).

The overall results of the data analysis as they relate to the third research question and hypothesis are shown in Table 9.3 (a reproduction of Table 8.25, Chapter 8).

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<sup>20</sup> The principles used to scatter the OE criteria across the model are those of a systems theory (input/output transaction). That is, an organisation acquires inputs (resources) from environment, processes them (transformation or throughput) into services and products (outputs or outcomes), and returns them to the environment.

Table 9.3: Summary of the Statistical Analysis Results of the Third Research Question and Hypothesis

		Statistical Significant Difference(s) of Goodness-of-fit Tests		Statistical Significant Difference(s) of Binomial Distribution Tests	Statistical Significant Difference(s) of Negative Responses	Group Cochran's Q Test	
		$\chi^2$	K-S		$\chi^2$	Positive Response Treated As	Statistical Significant Difference(s)
Input	Leadership	✓	✓	✓	✓	Success	✓
	Reliability	✓	✓	✓	✓		
	Professionalism	✓	✓	✓	✓		
	Autonomy	✓	✓	✓	✓		
	Human Behaviour	✓	✓	✓	✓		
	Innovation	✓	✓	✓	✓		
Transformation	Planning	✓	✓	✓	✓	Success	✗
	Evaluation	✓	✓	✓	✓		
	Info. Manag.&Comm.	✓	✓	✓	✓		
Output	Productivity	✓	✓	✓	✓	Success	✓
	Quality	✓	✓	✓	✓		
	Profitability	✓	✓	✓	✗		
	Turnover	✓	✓	✓	✓		
	Goal Attainment	✓	✓	✓	✓		
	Efficiency	✓	✓	✓	✗		
	Growth	✓	✓	✓	✓		
	Stability	✓	✓	✓	✗		
	Customer Satisfaction	✓	✓	✓	✗		
	Employee Satisfaction	✓	✓	✓	✓		
Attribute	Adaptability	✓	✓	✓	✓	Success	✓
	Flexibility	✓	✓	✓	✗		
	Cohesion	✓	✓	✓	✗		
	Morale	✓	✓	✓	✗		
	Organisation's Worth	✓	✓	✓	✗		
	HR Development	✓	✓	✓	✓		

✓=Significant                      ✗=Not significant

Of the 28 relevant criteria, three criteria ('External Support' and 'Resource Acquisition' of the Input phase, and 'Conformity' of the Transformation phase) were eliminated from the model as they did not prove to be reliable and valid criteria of OE in seaport organisations. The remaining 25 criteria, grouped into the four phases of the proposed model, were subjected to several individual and group examinations and cross-

examinations. These were to ensure that firstly they are correct criteria for OE assessment in seaport organisations, and secondly they are correctly clustered across the hypothetical system-based model.

The major findings of this study in relation to third research question and hypothesis suggest that:

1. Of the 28 OE criteria proposed in this research, only 25 criteria are proved to be correct measures of effectiveness in seaport organisations
2. As far as clustering of OE criteria across a system-based model of OE is concerned, of the 25 correct effectiveness criteria for assessment of OE in seaport organisations:
  - (i) Leadership, Reliability, Professionalism, Autonomy, Human Behaviour, and Innovation are correct and important effectiveness measures/factors/indicators of effectiveness at the Input phase of the model;
  - (ii) Planning, Evaluation, and Information Management & Communication are correct and important effectiveness measures/factors/indicators of effectiveness at the Transformation phase of the model;
  - (iii) Productivity, Quality, Profitability, Goal attainment, Efficiency, Growth, Stability, Turnover, Customer satisfaction, and Employee satisfaction are correct and important effectiveness measures/factors/indicators of effectiveness at the Output phase of the model; and
  - (iv) Adaptability, Flexibility, Cohesion, Morale, Organisation's worth, and HR development are correct and important effectiveness measures/factors/indicators of effectiveness in all three phases of the model (OE Attributes);
3. The results of an examination of the different categories of negative responses to each criterion are shown to be a minority (appendices 12, 13, 14, and 15) and hence do not impact the overall results described above (findings 2(i), 2(ii), 2(iii), and 2 (iv)).

## 2.4. Conclusions to Research Questions and Hypotheses

This section will address the findings of this study in the context of OE in seaport organisations and draw conclusions from these findings as related to each research question and hypothesis.

As stated in earlier chapters, a search on the literature failed to find any empirical studies which examined the OE of seaport organisations in general and Iran's PSO in particular. Therefore, the results of this research cannot be directly compared to any existing empirical research. However, it provides a fundamental building block upon which further studies can be based.

### 2.4.1. Regular OE Assessment in Seaport Organisations

As discussed at the outset of this thesis, seaport organisations should strive to boost their potential, improve the quality of their services, increase the performance of their ports, cope with increasing demands, and play an effective role in a country's expedition towards development. This led to a proposition that reaching these objectives requires an effective seaport organisation which, in turn, triggered the idea of regular effectiveness assessment in seaport organisations.

To conclude, there are three key findings of this research which have been identified in relation to the regular OE assessment in seaport organisations. First, *Seaport organisations ought to assess their OE regularly—preferably on an annual basis*. This finding accords with almost all previous studies on organisational effectiveness (discussed in Chapter 4). That is, despite all the ambiguities, disarrays and the chaotic conditions surrounding OE, many researchers found its assessment a necessity, and thus were anxious to study OE and conceptualise different models for regular OE assessment in different organisations.

Second, *regular OE assessment has relationship(s) with improvement of effectiveness in seaport organisations*. Knowing the current status of the organisation in terms of effectiveness through regular OE assessment can serve as a stimulus to upgrade the situation. Furthermore, recognition of a seaport organisation's strengths and

weaknesses, as a result of regular OE assessment, can assist the organisation to enhance its effectiveness in the future. This finding is based on the significant positive correlation(s) between the regular OE assessment variable and, effectiveness status of seaport organisations, indication of seaport organisations' strengths and weaknesses and future enhancement of seaport organisations' effectiveness variables (Appendix 10). However there was no significant correlation between regular OE assessment and future strategic (long-term) planning of seaport organisations (Appendix 10), which may imply that PSO managers sacrifice long-term effects of OE assessment to obtain its short-term effects (Cameron & Whetten 1983b).

Third, *organisation location, managerial position title, and manager's education level do not have any major effects on positively supporting the regular assessment of OE in seaport organisations*. With a few minor and negligible exceptions, it can be concluded that the PSO managers at any location (7 categories), rank (4 categories), and education level (2 categories) had almost similar views about regular OE assessment in seaport organisations and its positive consequences (e.g. future enhancement of effectiveness). That is, the acceptance of regular OE assessment and its consequences are universal and not related to any particular organisation location, managerial rank, or education level.

#### **2.4.2. The Impacts of Effective Seaport Organisations**

Increasing Operational Performance (OP) of seaports is one of the main and ultimate objectives of management in any seaport organisations. As stressed throughout this research, the effectiveness of seaport organisations and management is one of the main building blocks on which the operational performance of seaports is based. Therefore, seaports may operationally perform greater under the authority of more effective seaport organisations.

To conclude, there are three key findings of this research which have been identified in relation to the impacts of effective seaport organisations. First, *seaport organisations with higher OE have effects on the operational performance of their seaports*. That is, there should be a direct relationship between effectiveness of seaport organisations and operational performance of their seaports—an improvement in OE of a seaport organisation yields an increase in OP of a seaport. If OP is considered as an output of

seaport organisations, this finding supports the view of many researchers who based OE on organisational means and ends and viewed effectiveness of organisations in terms of productivity of output (for example: Bass 1952; Georgopoulos & Tannenbaum 1957; England 1967; Mott 1972; Glisson & Martin 1980; Rohrbaugh 1981; Quinn & Cameron 1983; Quinn & Rohrbaugh 1983).

Second, *greater OP of seaports, as a result of higher OE of their organisations, has positive effects on a country's development.* This is consistent with the extensive discussions presented in Chapters 2 and 3 that improving the performance of seaports, through effective organisations, impacts on different elements of the environment in which they operate (i.e. economy, society, trade, etc.). This finding is founded on the highly significant positive correlation(s) between the greater OP as a result of higher OE variable and, national development, socio-economic development, achievement of a higher share of international transit, and gaining higher maritime competitive advantage variables (Appendix 11).

Third, *organisation location, managerial position title, and manager's education level do not have any major effects on supporting the positive impacts of higher OE on OP of seaports, and thus on development.* With a few minor and negligible exceptions, it can be concluded that the PSO managers at any location (7 categories), rank (4 categories), and education level (2 categories) had almost similar positive views about achievement of greater OP through a more effective seaport organisation and its positive impacts on different aspects of development (e.g. national socio-economic development). This could mean that the desire of improving seaport performance, through an effective organisation, towards increasing national prosperity and development is shared by all PSO managers, and thus is independent of any particular organisation location, managerial rank, or education level.

So far, it is concluded that seaport organisations must assess their OE regularly, improve their effectiveness, and there are numerous benefits in such assessment and improvement, but the question of 'how should they assess their OE' is not yet answered. The next section will answer this question by interpreting and concluding the findings as related to the third and final research question and hypothesis.

### 2.4.3. A Model for OE Assessment in Seaport Organisations

Among many other reasons, the need for effectiveness assessment in a seaport organisation and the lack of any empirical model specifically designed and developed for this purpose were the main stimulators for undertaking this research. The essence of the extensive literature review on various disciplines was a hypothetical model assumed to be appropriate for OE assessment in seaport organisations. This section presents the major and most important findings of this research as related to the hypothesised model.

There are three key findings of this research which have been identified in relation to an appropriate method of OE assessment in seaport organisations and the hypothesised model. First, *Effectiveness of seaport organisations can be assessed through a model based on a systems framework (input-transformation-output)*. This supports one of the major findings of Chapter 4 regarding the popularity of the systems framework in effectiveness studies. In addition, this finding confirms the views of Mott (1972), Duncan (1973), Evan (1976), Stewart (1976), Steers (1976), Pennings and Goodman (1977), Katz and Kahn (1966, 1978), Cunningham (1978), Quinn and Cameron (1983), Quinn and Rohrbaugh (1983), and Ridley and Mendoza (1993), who viewed organisations from a systems perspective and based their OE models on characteristics of open systems.

Moreover, agreement of PSO managers in considering a system-based model for assessing the effectiveness of their organisation in the future could also emphasise the importance of evaluating effectiveness from a multidimensional systems perspective. However, inherent in the above finding is the notion that the systems approach is easily understood as a means of representing a model of OE by all managers regardless of their location and rank.

Second, *Leadership, Reliability, Professionalism, Autonomy, Human Behaviour, Innovation, Planning, Evaluation, Information Management & Communication, Productivity, Quality, Profitability, Goal attainment, Efficiency, Growth, Stability, Turnover, Customer satisfaction, Employee satisfaction, Adaptability, Flexibility, Cohesion, Morale, Organisation's worth, and HR development are correct indicators of effectiveness in seaport organisations*. These indicators are approved by PSO managers as correct criteria of OE in a large organisation like PSO. Assessing effectiveness

through these indicators, based on a systems model, should indicate the status of the PSO in terms of effectiveness.

The last, but not the least, finding of this research relates to the correct distribution<sup>21</sup> of the above indicators (second finding) across different phases of a system-based model (first finding) to finalise a model appropriate for assessment of OE in seaport organisations. The finalised system-based model of OE as approved by PSO managers is shown in Figure 9.1.

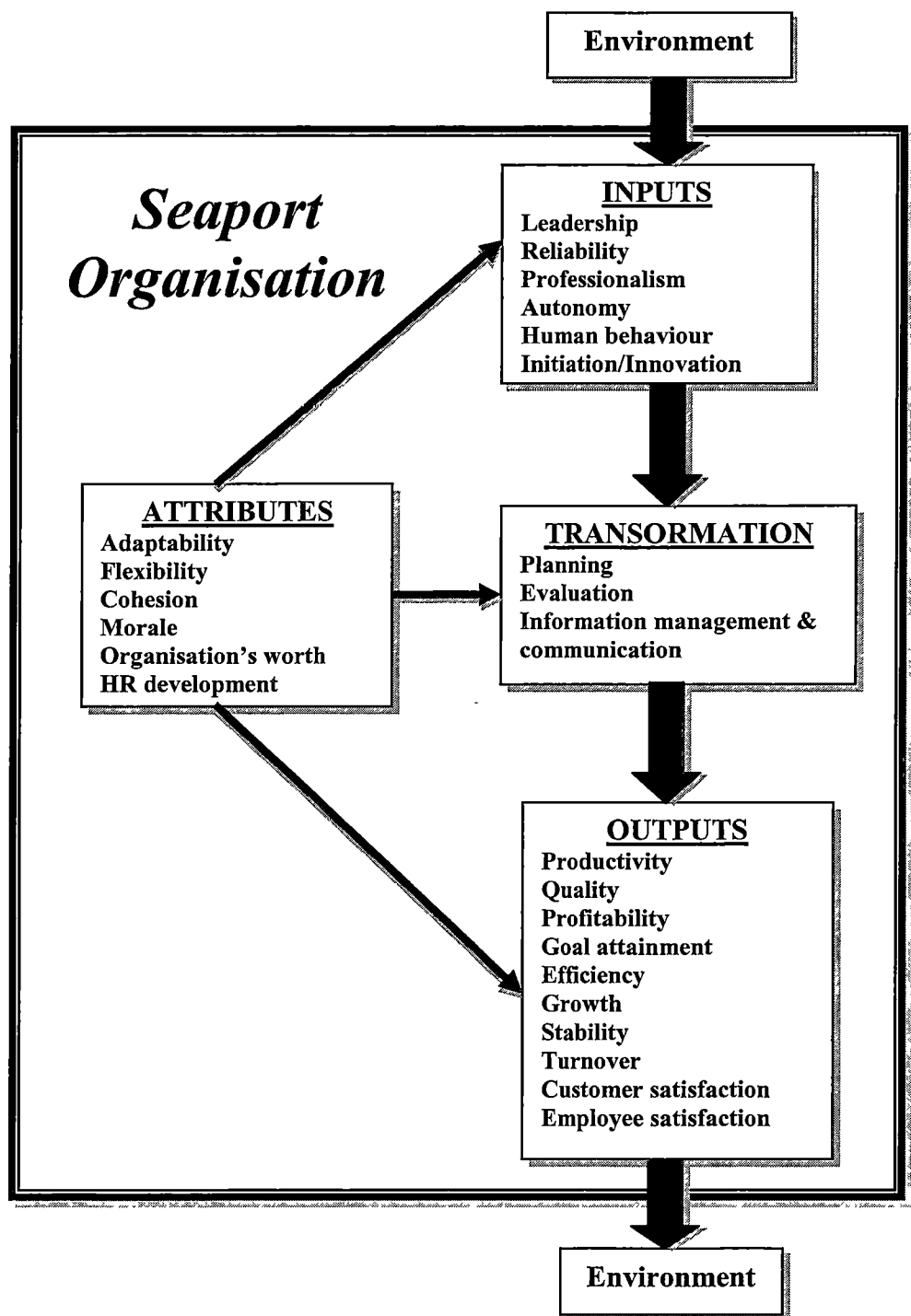
As can be seen, this model is consistent with the beliefs of many organisation researchers, particularly those of Robbins and Barnwell (1994) and Zammuto (1982), in that it views the seaport organisation as a whole, considers almost all important aspects of effective seaport management, focuses on elements related to organisational process, and concentrates on means necessary for viability and survival of seaports.

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<sup>21</sup> Grouping and arranging the indicators into a systems format.



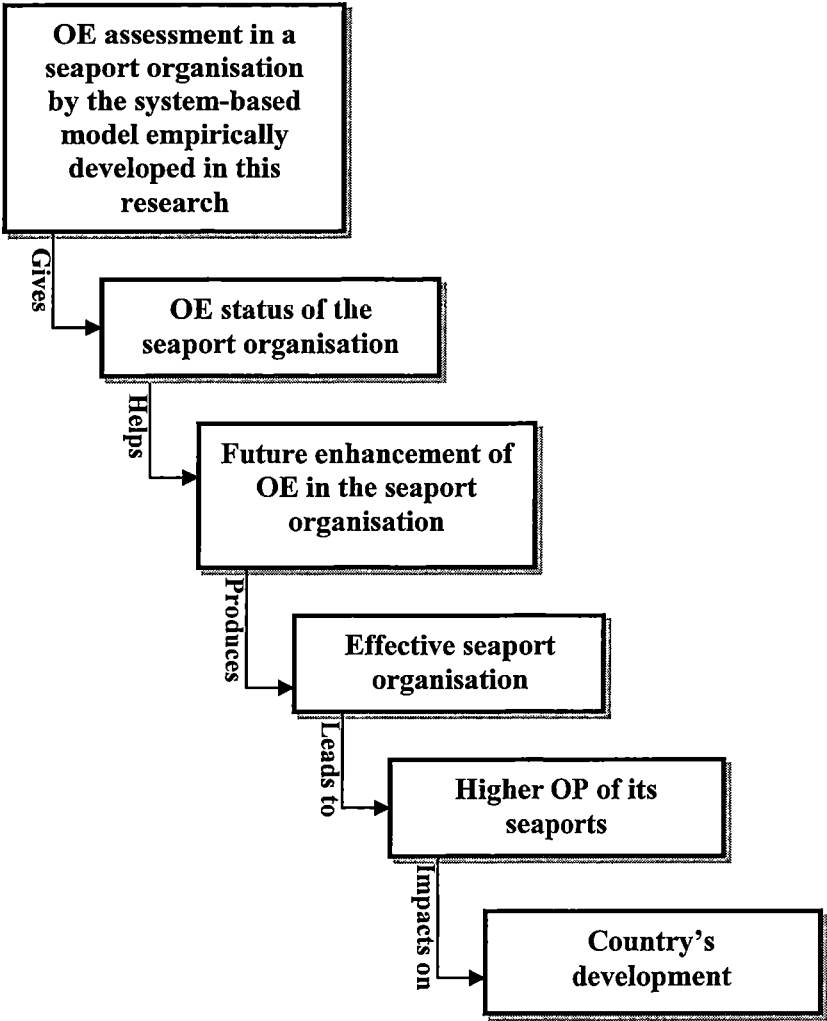
Figure 9.1: The Finalised System-based OE Model for Seaport Organisations



In summary, seaport organisations can utilise the above empirically developed system-based model of OE for regular assessment of their effectiveness (preferably on an annual basis) to learn about their status in terms of effectiveness. Based on the results of such assessment, seaport organisations then can take swift and necessary corrective

actions to enhance their effectiveness in the future and consequently achieve a higher operational performance at their seaports which, in turn, has positive impacts on national development. This conclusion is shown in Figure 9.2.

**Figure 9.2: Overall Conclusion of This Research**



**2.4.4. Conclusions to Research problem**

The main issues were stated in the first chapter and revisited at the outset of this chapter. The research problem essentially concerns the important role of seaports and their effective organisations, the need for regular assessment of OE in their organisations, and producing a model for such assessment. There is a lack of any form of empirical research on OE of seaport organisations, its assessment methods, and positive impacts of such assessment.

Going beyond the quantitative analysis of Chapters 7 and 8, and in view of the exploratory nature of the study, the findings of this research concerning the research problem may all be described as significant. The overall findings of this research tend to suggest that:

- Seaports, as an integral element of the transportation network, and their organisations play a vital role in a country's development. Therefore, the introduction of OE and its regular assessments to seaport organisations can help improve seaports.
- Effective seaport organisations, as a result of regular OE assessment and OE enhancement, result in higher performance of their seaports.
- Development of an appropriate model for OE assessment in seaport organisations helps to fill in a gap in the literature of both OE and seaport organisation studies and, for the first time, provides a potential tool for seaport managers to assess the OE of their organisations.

### **3. Implications of This Research**

A number of implications, based on the findings of this research (both qualitative and quantitative), have been identified throughout several of the previous chapters. This section aims to summarise those implications and present some directions for further research.

First, this research makes a contribution to further understanding the concept of OE in service industry organisations (e.g. transport organisations) and its applications to seaport organisations. That is, as discussed previously, this is the first academic research in the area of OE of seaport organisations in general and of Iran's PSO in particular. Its findings thus should be of great significance to PSO and PSO managers, as well as decision-makers of other seaport organisations.

Second, it appears that the present management of seaport organisations rely exclusively on Operational Performance (OP) assessment of seaports through monitoring KPIs and ignoring the OE assessment of their organisations and its positive impacts on OP. Therefore, this study adds to the body of knowledge concerning organisational assessment practices by making a clear distinction between OP and OE, persuading managers of seaport organisations to implement regular OE assessment, and convincing them that seaports would perform better under the authority of more effective organisations.

Third, in addition to popularity, the major implication of accepting a systems view of organisational effectiveness, as compared to goal-achievement and multiple constituency models, is that the seaport organisations' objectives need to be carried out through pre-defined processes (Schneider 1983); input, transformation, and output are the processes that require regular assessment.

Fourth, before conceptualising any model, the result of the intensive literature review reported in this research provides a menu of 78 OE criteria (Table 5.1, Chapter 5) that can be used to build OE models for any other organisations in service industry. That is, although this research's main focus is seaport organisations, the generated OE menu can be applied to and used by other organisations.

Fifth, in a very broad sense, this research may also provide some justification and impetus for all managers and organisations, either within or outside seaport organisations, to engage in the systematic process of assessing effectiveness, and perhaps enacting legislation, policies or processes for the obligatory continuous OE assessment of their organisations.

Sixth, although the finalised model is meant to serve as a tool for OE assessment in Iran's PSO, other findings of this research (i.e. research questions 1 and 2, Chapter 7) can be generalised to all seaport organisations in the world. However, the finalised model may also be used by other seaport organisations with a similar type of administration (i.e. national, public, private...), responsibilities (i.e. landlord, tool, service), and functions as of Iran's PSO (as described in Chapter 3).

Seventh, as mentioned previously, one of the most difficult tasks of managers is to identify appropriate indicator(s) of effectiveness to assess the OE of their organisation. This research makes that task easy for Iran's PSO managers by providing a model with appropriate criteria ready for assessing the effectiveness of their organisation, which is the result of their own participation.

Eighth, the multidimensional nature of the finalised OE model provides for a more detailed assessment of effectiveness in seaport organisations which, in turn, leads to fine-grained analyses of the OE assessment results, and ultimately more accurate corrective actions to enhance the organisations' status in terms of effectiveness.

Although the results of this research have significant implications for practice in seaport organisations (as outlined above), there are several key areas where further research in the field of seaport organisation's OE could be undertaken in the future. For example, future research can utilise the model developed in this study and conduct a survey to practically assess the OE of PSO to find out its effectiveness status. This may call for case study research.

The current research did not practically assess the relationships between effectiveness of seaport organisations and performance of their seaports. Therefore, future research can be conducted to evaluate the relationships between OE and OP in practice. That is, after attempts are made to enhance OE of the organisation as a result of initial OE assessment, OP of seaport can be measured and compared with the previous results to realise the effect of higher OE of the organisation on OP of its seaports.

Future research may also consider it appropriate to base OE assessment on models other than systems (e.g. multiple constituency, goal-achievement), and consequently find other OE indicators more appropriate than those selected for the systems-based model in this research.

A future research can focus on providing a list/menu of indicators to managers of any seaport organisation (through interview or questionnaire survey) or a panel of experts and ask them to firstly select a set of criteria that they consider to be the most significant and decisive to the survival and viability of their organisations, and secondly to rate

them in order of importance. Based on the results of such survey, the research can induce an OE model for that organisation only.

Further exploration of other indicators influencing the effectiveness of seaport organisations (i.e. in addition to or other than the 78 criteria identified in this research), other effects (positive and negative) of regular OE assessment in seaport organisations, and other positive impacts of effective seaport organisations than those verified in this research could be examined in future research.

Finally, it was noted from the survey that there were varying degrees of support from managers of different educational levels (i.e. BSc. and MSc.). These variations could be related to a number of factors, and to address this further research is required.

#### **4. Limitations**

Despite the chapter reporting a number of conclusions, it should be borne in mind that the results of such research cannot produce irrefutable conclusions. In addition, there are a number of limitations that future research may consider taking into account.

First, it should be reiterated that this research is the first and the only study of OE in seaport organisations. Therefore, as far as the comparability of this study is concerned, the final results could not be compared with any of the existing empirical research.

Second, the results of this research are limited to public seaport organisations. That is, the focus of the research was only on public organisations which ‘almost never “fail” in the sense of dying’ (Schneider 1983, p. 46). Therefore, the important factor of viability was overlooked at some stages during the research.

Third, the results obtained are based on the views of Iranian PSO managers of different locations, ranks, and qualifications. Therefore, their generalisability might be disputable.

Fourth, due to geographical dispersion, the survey was limited to managers in PSO headquarters and its six major seaports (a total of 180 managers representing the whole organisation), and did not try to reach minor multi-purpose port managers.

Fifth, although all necessary considerations were taken into account to develop a bias-free work; particularly in the construction of the survey instrument and conduct of the survey for data collection (Chapter 6), the chance(s) of collecting perceptual and partially biased data, in one way or another, cannot be completely denied.

Sixth, as OE and OP of Iran's PSO have not been assessed practically in this study, and due to the nature of some of the data and the statistical techniques used for their analysis, it is not known without further research whether the conclusions reported in this thesis are all actual relationships or whether some are the products of data analysis procedures.

## 5. Conclusion

At the outset of this thesis it was indicated that little agreement exists regarding what OE means and how properly to assess it. It was also pointed out that nothing has been done on the links between effectiveness of seaport organisations and achievement of their objectives, the ways of assessing organisational effectiveness for seaport organisations, and the possible impacts of such assessment.

Therefore, this thesis sought to introduce the concept of OE in seaport organisations, explore the rationale for regular assessment of OE in seaport organisations, examine the impacts of effective organisations on OP of their seaports and ultimately on national development, and empirically develop an appropriate model for regular OE assessment in seaport organisations.

The results of this research strongly suggest that all seaport organisations must assess their effectiveness regularly, preferably in an annual basis. Such assessment contributes to improvement of effectiveness in seaport organisations.

The results of this study also strongly point to the fact that effective seaport organisations positively impact on the operational performance of their seaports. Operational performance of seaports, in turn, positively impacts on country's development.

Furthermore, the results of this research convincingly show that a system-based model developed and approved by this research (Figure 8.1) is an appropriate tool for regular OE assessment in seaport organisations.

Finally, it is hoped that this research has helped to initiate new opportunities and approaches for further future research in the area of OE, as applied to seaport organisations, to uncover more benefits of Organisational Effectiveness (OE) assessment in seaport organisations that may not have been fully revealed by this research.



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# **Appendices**

**Appendix 1: Summary of 49 OE Models  
Revision**

## Summary of OE Models

<div>Effectiveness Indicators</div> <div>Models</div>		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Bass (1952)	Georgopoulos & Tannenbaum (1957)	Etzioni (1960)	Bennis (1962)	Katz & Kahn (1966, 1978)	England (1967)	Yutchman & Seashore (1967)	Price (1968)	Friedlander & Pickle (1968)	Mahoney & Weitzel (1969) <sup>1</sup>	Mahoney & Weitzel (1969) <sup>2</sup>	Ghorpade (1971)	Mott (1972)	Pugh & Pheysey (1973)	Khandwalla (1973)	Duncan (1973)
1	Productivity	x	x			x			x				x	x			
2	Profitability	x				x			x					x	x		
3	Self-maintaining	x															
4	Organisation's worth	x															
5	Adaptability			x				x					x	x		x	
6	System resource			x			x										
7	Control over environment				x		x										
8	Sense of identity			x													
9	Capacity to test reality			x													
10	Efficiency					x						x					
11	Conformity							x									
12	Morale							x						x			
13	Institutionalisation							x									
14	Growth				x												
15	Storage				x												
16	Survival				x												
17	Employee satisfaction								x								
18	Social value								x								
19	Flexibility		x										x				
20	Goal attainment															x	
21	Integration															x	
22	Cohesion																
23	Public values of Management*																
24	Absence of strain		x														
25	Red. in economic power concentration											x					
26	Employee enhancement											x					
27	Goal optimisation			x													
28	Human behaviour																
29	Outcomes																
30	Processes																
31	Structures																
32	Coping with uncertainty																
33	Substitutability																
34	Centrality																
35	Organisational instrumentality																
36	Organisational Satisfaction																
37	Organisational location																
38	Time dimension																
39	Planning									x							
40	Information management																
41	Communication																
42	Stability																
43	Control																
44	Human resource development																
45	Readiness																
46	Detailed knowledge																
47	Taxonomy																
48	Causal linkages																
49	Capabilities of reconstructing input																
50	Sensitivity to complexity																
51	Ability to keep disagreement tacit																
52	Reputation													x			

[illegible]

### Summary of OE Models (Continued)

[illegible]



### Summary of OE Models (Continued)

<div>Effectiveness Indicators</div> <div>Models</div>		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
		Connolly, Conlon & Deutsch (1980)	Rohrbaugh (1981)	Cameron & Whetten (1981)	Gaertner & Ramnarayan (1983)	Quinn & Cameron (1983) <sup>1</sup>	Quinn & Cameron (1983) <sup>2</sup>	Quinn & Cameron (1983) <sup>3</sup>	Quinn & Cameron (1983) <sup>4</sup>	Weick & Daft (1983)	Quinn & Rohrbaugh (1983) <sup>1</sup>	Quinn & Rohrbaugh (1983) <sup>2</sup>	Quinn & Rohrbaugh (1983) <sup>3</sup>	Quinn & Rohrbaugh (1983) <sup>4</sup>	Cameron (1986)	Smith & Gannon (1987)	Ridley & Mendoza (1993)	Thibodeaux & Favilla (1996)
1	Productivity		x					x			x							
2	Profitability																	x
3	Self-maintaining																	
4	Organisation's worth																	
5	Adaptability																x	x
6	System resource		x	x		x							x					
7	Control over environment																	
8	Sense of identity																	
9	Capacity to test reality																	
10	Efficiency			x				x			x						x	
11	Conformity																	
12	Morale								x					x				x
13	Institutionalisation																	
14	Growth					x							x					
15	Storage																	
16	Survival																x	
17	Employee satisfaction																	
18	Social value																	
19	Flexibility		x			x							x				x	x
20	Goal attainment							x										
21	Integration																	
22	Cohesion		x						x					x				
23	Public values of Management*																	
24	Absence of strain																	
25	Red. in economic power concentration																	
26	Employee enhancement																	
27	Goal optimisation																	
28	Human behaviour																	
29	Outcomes				x													
30	Processes			x	x												x	
31	Structures														x			
32	Coping with uncertainty																	
33	Substitutability																	
34	Centrality																	
35	Organisational instrumentality																	
36	Organisational Satisfaction	x																
37	Organisational location	x																
38	Time dimension	x																
39	Planning		x					x			x					x		x
40	Information management		x					x				x						x
41	Communication							x				x				x		
42	Stability		x					x				x						
43	Control							x			x					x		
44	Human resource development		x						x					x				x
45	Readiness					x							x					
46	Detailed knowledge									x								
47	Taxonomy									x								
48	Causal linkages									x								
49	Capabilities of reconstructing input									x								
50	Sensitivity to complexity									x								
51	Ability to keep disagreement tacit									x								
52	Reputation																	

53	Autonomy																	
54	Turnover																	
55	Power																	
56	Consolidation																	
57	Objective setting					x			x									
58	Evaluation					x			x									
59	External support										x							
60	External environment													x				
61	Strategy													x				
62	Demographics													x				
63	Finances													x				
64	Leadership														x			
65	Knowing the business														x			
66	Maximisation of return															x		
67	Self-Regulation															x		
68	Contribution to the environment															x		
69	Boundary permeability															x		
70	Sensitivity to change (ext. & int.)															x	x	
71	Conflict																x	
72	Customer satisfaction																x	
73	Productivity-support-utilisation																	
74	Reliability																	
75	Initiative																	
76	Cooperation																	
77	Staff development																	
78	Output quality		x							x	x	x	x					

## **Appendix 2: Questionnaire's Information Letter (English)**





Reference:

## Dear Respondent:

Have you ever wondered what makes an effective organisation? Is it 'good' managers? 'Good' human resources? 'Good' planning? Longevity? Profitability? Flexibility? Just what are the correct measures of effectiveness in a port organisation? How can effectiveness be measured in a port organisation? If we can have 10-20 minutes of your time, we may be able to answer some of these questions for you as part of the requirements for research coordinator's (Jafar Sayareh's) PhD in Maritime Policy and Management at the Australian Maritime College, Tasmania, Australia.

We need your help to carry out action research for the benefit of port organisations. All of us want port organisations to be as effective as possible to successfully meet the potential critical problems facing the maritime industry. Port organisations are in need of a method or model for assessing and measuring their effectiveness, in order to help them recognise their internal strengths and weaknesses, and external opportunities and threats.

To accomplish this, a number of key factors influencing the effectiveness of port organisations have been identified by the researcher (**please note, this is not about operational performance monitoring, but it is about the effectiveness of port organisation itself**). Based on identified factors, a system-based organisational effectiveness (OE) model has been developed by the researcher to facilitate the assessment of OE in port organisations. If accurate indicators of OE have been utilised in the model, the result of assessment will indicate the status of the port organisation in terms of effectiveness. That, in turn, can be used as a guide to enhance the effectiveness of the organisation in the future. Now, we are asking for your cooperation, time, and insights to test the above-mentioned model of OE.

The enclosed questionnaire is being sent to all top managers, middle managers, department heads, and supervisors in your organisation. Because of your strategic role in your organisation, you can provide important information about effectiveness assessment in port organisations. Please note that the researchers have not accessed your personal contact details or any other information protected by privacy law.

Your participation is entirely voluntary and your consent to participation is evidenced by completion and return of the questionnaire to the research coordinator.



# Australian Maritime College

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Australia's National Centre for Maritime Education, Training and Research

Reference:

Your response will be kept strictly confidential and will not be used for any other purpose than this research project. Since the questionnaire does not ask your name, your participation and responses will not be identifiable in the research output; only the organisation (PSO) will be identifiable in the research output.

Please contact Jafar Sayareh (Mobile: 0915 1450078, E-mail: [J.Sayareh@amc.edu.au](mailto:J.Sayareh@amc.edu.au)) if you may have any question regarding the questionnaire. The research coordinator will be in your organisation on ???/???/???? to distribute the questionnaire, explain and clarify the objectives of the research and to answer your questions (if any), and to collect the completed questionnaires. The collected data will be securely stored on the Australian Maritime college premises for a period of 5 years. The data will be destroyed at the end of 5 years.

A summary of the results will be forwarded to your organisation/branch head after the data are analysed.

This research is being carried out in the Department of Maritime Business at the Australian Maritime College (AMC), and the project has received approval from the Human Research Ethics Committee (Tasmania) Network. If you have any concerns of an ethical nature, you may contact the Executive Officer of the Human Research Ethics Committee (Tasmania) Network, Amanda McAully (phone +61 3 6226 2763; email: [Amanda.McAully@utas.edu.au](mailto:Amanda.McAully@utas.edu.au)).

Thank you very much for your time and cooperation. We greatly appreciate your organisation's and your help in furthering this research endeavour.

Sincerely Yours

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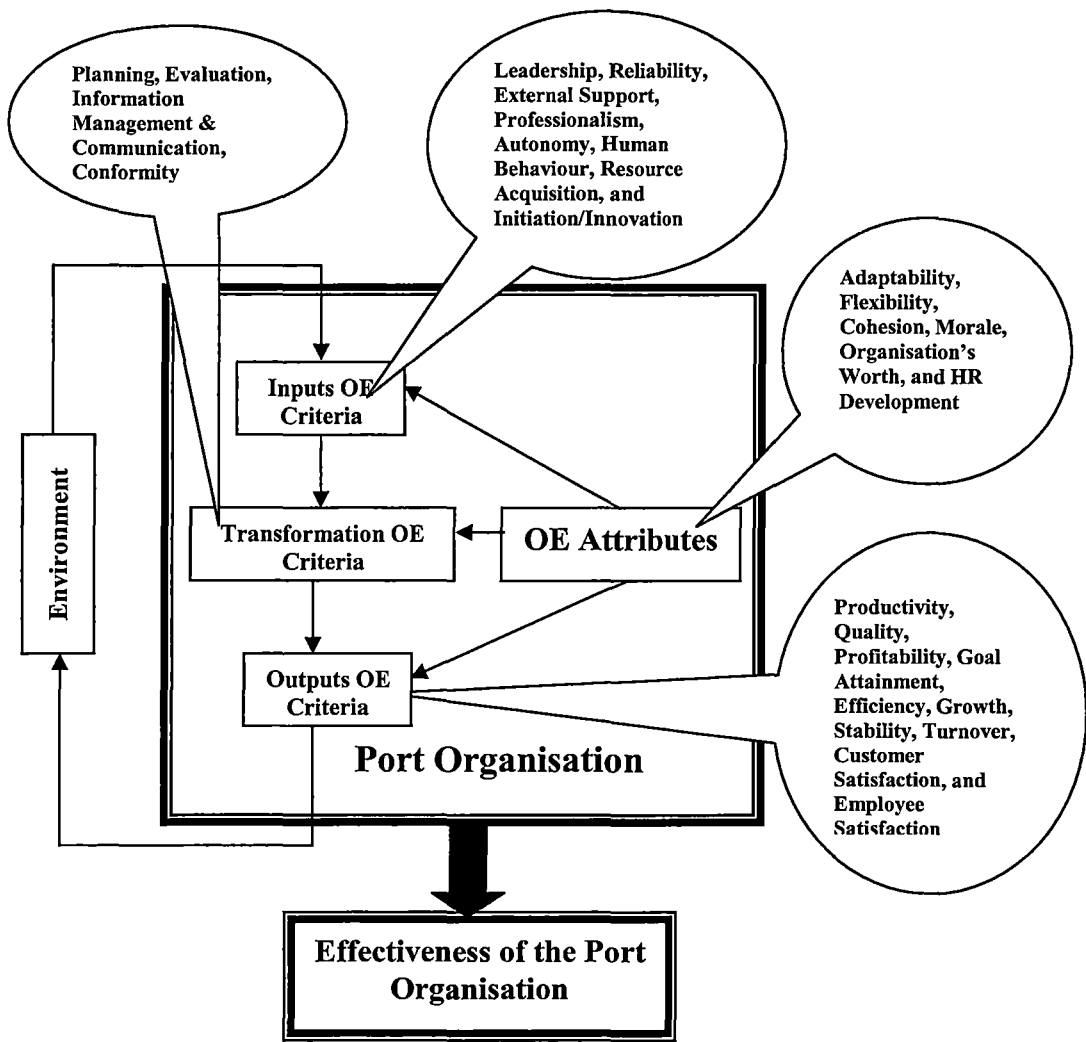
Email: [J.Sayareh@amc.edu.au](mailto:J.Sayareh@amc.edu.au)

## **Appendix 3: Questionnaire (English)**

## Hypothetical Organisational Effectiveness (OE) Model for Port Organisations

**OE Definition:** Organisational Effectiveness (OE) is the extent to which an organisation as a social system, given certain resources and means, fulfils its objectives without incapacitating its means and resources and without placing undue strain upon its members (Georgopoulos and Tannenbaum 1957).

**The Model:** The hypothesised system model of OE is shown below. All organisations (including port organisations) are open systems that made up of interdependent components (sub-systems) and processes, and that operate within larger systems and dynamically interact with their environment. The model is based on a simple process of **inputs-transformation-outputs**. The effectiveness criteria, which are assumed to be important for port organisations, are then grouped into three phases (functions) of a system (inputs-transformation-outputs). Meanwhile, those criteria, which are determined to be important and necessary for effective processes of all three functions, are hypothesised and grouped as common OE criteria (OE attributes).



## SECTION A

## PART 1: INPUTS

With reference to the definition of each criterion (provided in a separate sheet), please place a check (✓) to answer the first part of each question. If your answer to the first part is “No”, then circle a category (1,2,3 or 4) that best expresses your opinion in the second part of each question.

## Categories

**Transformation**  
**Outputs**  
**Attributes**  
**Not a measure of OE at all**

1. Is **Leadership** a correct indicator of effectiveness at the inputs stage?
- ☐ 1. Yes      ☐ 2. No → If not, to which category does it belong?      1      2      3      4
- ↓
2. Is **Reliability** a correct indicator of effectiveness at the inputs stage?
- ☐ 1. Yes      ☐ 2. No → If not, to which category does it belong?      1      2      3      4
- ↓
3. Is **External support** a correct indicator of effectiveness at the inputs stage?
- ☐ 1. Yes      ☐ 2. No → If not, to which category does it belong?      1      2      3      4
- ↓
4. Is **Professionalism** a correct indicator of effectiveness at the inputs stage?
- ☐ 1. Yes      ☐ 2. No → If not, to which category does it belong?      1      2      3      4
- ↓

5. Is **Autonomy** a correct indicator of effectiveness at the inputs stage?

☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4  
↓

6. Is **Human behaviour** a correct indicator of effectiveness at the inputs stage?

☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4  
↓

7. Is **Resource acquisition** a correct indicator of effectiveness at the inputs stage?

☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4  
↓

8. Is **Initiation/innovation** a correct indicator of effectiveness at the inputs stage?

☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4  
↓

9. Can you think of any other indicator(s) that should be included in this stage?

☐1. Yes    ☐2. No

↓

If Yes, what are they?.....

## PART 2: TRANSFORMATION

With reference to the definition of each criterion (provided in a separate sheet), please place a check (✓) to answer the first part of each question. If your answer to the first part is “No”, then circle a category (1,2,3 or 4) that best expresses your opinion in the second part of each question.

		<u>Categories</u>			
		Inputs	Outputs	Attributes	Not a measure of OE at all
1.	Is <b><u>Planning</u></b> a correct indicator of effectiveness at the transformation stage?				
	<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → If not, to which category does it belong?	1	2	3	4
	↓				
2.	Is <b><u>Evaluation</u></b> a correct indicator of effectiveness at the transformation stage?				
	<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → If not, to which category does it belong?	1	2	3	4
	↓				
3.	Is <b><u>Information management and communication</u></b> a correct indicator of effectiveness at the transformation stage?				
	<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → If not, to which category does it belong?	1	2	3	4
	↓				
4.	Is <b><u>Conformity</u></b> a correct indicator of effectiveness at the transformation stage?				
	<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → If not, to which category does it belong?	1	2	3	4
	↓				
5.	Can you think of any other indicator(s) that should be included in this stage?				
	<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No				
	↓				
	If Yes, what are they?.....				





6. Is **Efficiency** a correct indicator of effectiveness at the outputs stage?
- ☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4
- ↓
7. Is **Growth** a correct indicator of effectiveness at the outputs stage?
- ☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4
- ↓
8. Is **Stability** a correct indicator of effectiveness at the outputs stage?
- ☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4
- ↓
9. Is **Customer satisfaction** a correct indicator of effectiveness at the outputs stage?
- ☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4
- ↓
10. Is **Employee satisfaction** a correct indicator of effectiveness at the outputs stage?
- ☐1. Yes      ☐2. No → If not, to which category does it belong?      1    2    3    4
- ↓
11. Can you think of any other indicator(s) that should be included in this stage?
- ☐1. Yes    ☐2. No
- ↓
- If Yes, what are they?.....

**PART 4: ATTRIBUTES**

With reference to the definition of each criterion (provided in a separate sheet), please place a check (✓) to answer the first part of each question. If your answer to the first part is “No”, then circle the category(s) (1,2,3 or 4) that best expresses your opinion in the second part of each question.

	<u>Categories</u>			
	Inputs	Transformation	Outputs	Not a measure of OE at all
1. In your opinion, is <u>Adaptability</u> an indicator of effectiveness at all 3 stages (Inputs-Transformation-Outputs) of a port organisation system?				
<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → If not, to which category(s) does it belong?	1	2	3	4
↓				
2. In your opinion, is <u>Flexibility</u> an indicator of effectiveness at all 3 stages (Inputs-Transformation-Outputs) of a port organisation system?				
<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → If not, to which category(s) does it belong?	1	2	3	4
↓				
3. In your opinion, is <u>Cohesion</u> an indicator of effectiveness at all 3 stages (Inputs-Transformation-Outputs) of a port organisation system?				
<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → If not, to which category(s) does it belong?	1	2	3	4
↓				
4. In your opinion, is <u>Morale</u> an indicator of effectiveness at all 3 stages (Inputs-Transformation-Outputs) of a port organisation system?				
<input type="checkbox"/> 1. Yes <input type="checkbox"/> 2. No → If not, to which category(s) does it belong?	1	2	3	4
↓				

5. In your opinion, is **Organisation's worth** an indicator of effectiveness at all 3 stages (Inputs-Transformation-Outputs) of a port organisation system?

☐1. Yes    ☐2. No → If not, to which category(s) does it belong?    1    2    3    4  
↓

6. In your opinion, is **Human resource development** an indicator of effectiveness at all 3 stages (Inputs-Transformation-Outputs) of a port organisation system?

☐1. Yes    ☐2. No → If not, to which category(s) does it belong?    1    2    3    4  
↓

7. Can you think of any other indicator(s) that should be included in this stage?

☐1. Yes    ☐2. No

↓

If Yes, what are they?.....

**SECTION B**

**The Impacts of overall effectiveness assessment of a port organisation**

Please circle the number that best reflects your opinion regarding each of the following statements. Please note that there are 5 potential answers (1 to 5), where 5 means “Strongly Agree” and 1 means “Strongly Disagree”.

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Neutral</u>	<u>Agree</u>	<u>Strongly Agree</u>
1. Port organisations should assess and measure their effectiveness regularly (e.g. annually).	1	2	3	4	5
2. A system-based model of OE is an appropriate tool for assessing/measuring OE of a port organisation regularly.	1	2	3	4	5
3. Assessing organisational effectiveness on a regular basis (e.g. annually) will indicate the status of the port organisation in terms of effectiveness.	1	2	3	4	5
4. The result of organisational effectiveness assessment on a regular basis (e.g. annually) can be used as a guide to enhance the effectiveness of a port organisation in the future.	1	2	3	4	5
5. The result of organisational effectiveness assessment on a regular basis (e.g. annually) can be used as a guide for future strategic (long-term) planning of the port organisation (e.g. infrastructure...).	1	2	3	4	5
6. The result of organisational effectiveness assessment on a regular basis (e.g. annually) will give indication(s) of a port organisation’s strengths and weaknesses.	1	2	3	4	5
7. The higher the effectiveness of a port organisation, the greater will be the operational performance of its ports.	1	2	3	4	5

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 8. Greater operational performance of ports, as a result of higher effectiveness of their organisation, will have positive impacts on national development in general.   | 1 | 2 | 3 | 4 | 5 |
|  |   |   |   |   |   |
| 9. Greater operational performance of ports, as a result of higher effectiveness of their organisation, will positively contribute to national socio-economic development in particular.                             | 1 | 2 | 3 | 4 | 5 |
|  |   |   |   |   |   |
| 10. Greater operational performance of ports, as a result of higher effectiveness of their organisation, will help the country to achieve a higher share of international transit trade.                             | 1 | 2 | 3 | 4 | 5 |
|  |   |   |   |   |   |
| 11. Greater operational performance of ports, as a result of higher effectiveness of their organisation, will help the country to gain a maritime competitive advantage in the region (mainly among Gulf countries). | 1 | 2 | 3 | 4 | 5 |

**SECTION C**  
**BACKGROUND INFORMATION**

Please place a check (✓) or circle the most appropriate answer to each of the following questions.

In a few cases please fill-in the blank.

1. Please indicate the highest level of education you have completed:

- ☐1. Doctorate      ☐2. Master      ☐3. Bachelor

2. In which branch of your organisation are you currently working?

- ☐1. Headquarters    ☐2. Bandar Abbas    ☐3. B.I.K.    ☐4. Bushehr  
☐5. Bandar Anzali    ☐6. Noshahr      ☐7. Chabahar

3. How long have you been in this branch?.....Years

4. How long have you been with the organisation?.....Years

5. What is your job/position title?.....

6. How long have you been in your current job/position?.....Years

7. In your opinion, how often should Organisational Effectiveness (OE) be measured in a port organisation?

- ☐1. Biannually      ☐2. Annually      ☐3. Biennially      ☐4. Every 5 years

8. Would you consider to use the proposed OE model for assessing effectiveness of your organisation/branch/department in the future?

- ☐1. Yes      ☐2. No

## **Appendix 4: OE Criteria Definitions (English)**

### Definitions of Inputs OE Criteria

1	<b>Leadership</b>	The importance of providing direction and a vision of the future both to organisational members and members of the organisation's external environment;
2	<b>Reliability (in performance of employees)</b>	The extent to which personnel are meeting organisation's objectives without the necessity of follow-up or checking;
3	<b>External support (support from government)</b>	The degree to which an organisation is being supported by government; or government's interest in and concern for well-being of the organisation;
4	<b>Professionalism</b>	The extent of knowledge about the industry, the organisation and its members, and the organisation's problems before taking action;
5	<b>Autonomy</b>	Autonomy in work and workplace in terms of ownership, control and decision-making;
6	<b>Human behaviour</b>	The degree of acceptance of organisational goals by employees and their commitment towards goal achievement;
7	<b>Resource acquisition</b>	The ability of an organisation to successfully interact with its environment to acquire scarce and valued resources necessary to its effective operation;
8	<b>Initiation/innovation</b>	The degree of initiation of ideas and practices, and the degree of support these ideas (innovation & creativity) receive from organisation;

### Definitions of Transformation OE Criteria

1	<b>Planning</b>	The degree to which the organisation is able to cope with emergencies; concentrate upon the primary goal; or the degree to which an organisation systematically plans its future steps;
2	<b>Evaluation (monitoring)</b>	Evaluations of organisations, or units, by the individuals and groups in the context of environment with which it interacts (e.g. suppliers, customers, stakeholders, enforcement agencies, and the general public);
3	<b>Information management &amp; communication</b>	Completeness, efficiency, and accuracy in analysis and distribution of information; free flow of work information and communication within the organisation;
4	<b>Conformity (or compliance)</b>	The degree to which performance responds to the norms of a social system;

### Definitions of Outputs OE Criteria

1	<b>Productivity</b>	The degree to which an organisation is productive in terms of goods or services;
2	<b>Quality</b>	The quality of the primary service or product provided by the organisation;
3	<b>Profitability</b>	The degree to which an organisation is profitable after all costs and obligations are met;
4	<b>Goal attainment</b>	The degree to which the organisation appears to place a high value on achieving major goals;
5	<b>Efficiency</b>	The ability to produce a desired result while minimising the expenditure of time, effort, and expense; or a ratio that reflects a comparison of some aspects of unit performance to the cost incurred for that performance;
6	<b>Growth</b>	An increase in such variables as total manpower, plant capacity, assets, sales, profits, market share, and number of innovations. It implies a comparison of an organisation's present state with its own past state;
7	<b>Stability</b>	The maintenance of structure, function, and resources through time, and more particularly, through periods of stress;
8	<b>Turnover</b>	A measure of the relative number/rate of voluntary terminations, which is always assessed via archival records;
9	<b>Customer satisfaction</b>	The degree to which an organisation satisfies its customers;
10	<b>Employee satisfaction</b>	The degree to which an organisation satisfies its members;



**Definitions of OE Attributes**

<b>1</b>	<b>Adaptability</b>	The degree of response to changing conditions (environmental and internal problems) and adapting to external stresses; or the ability to undergo longer lasting reorganisation in response to chronic environmental pressure that imposes continuous constraints on the organisation's operations;
<b>2</b>	<b>Flexibility</b>	The ability to undergo temporary reorganisation or adjustment under acute, non-routine pressure from the internal or external environments;
<b>3</b>	<b>Cohesion</b>	Defined by an organisation in which the members like one another, work well together, communicate fully and openly, and coordinate their work efforts;
<b>4</b>	<b>Morale</b>	It is a group phenomenon involving extra effort, goal commonality, commitment, and feelings of belonging;
<b>5</b>	<b>Organisation's worth</b>	The degree to which the organisation is of value to its members, and the organisation and its members, in turn, are of value to society (the worth of the organisation to the individual members and the worth of both individual members and organisation to society); or the ability of a system to maintain itself by returning human benefit in sufficient degree to induce participant cooperation;
<b>6</b>	<b>Human resource development</b>	The amount of effort the organisation devotes to developing its human resources;

## **Appendix 5: Questionnaire's Information Letter (Persian)**



Reference:

## بسمه تعالی

تاریخ: ۱۳۸۳/۹/۹

پاسخ دهنده محترم  
سلام علیکم

آیا تاکنون اندیشیده اید که چه عاملی باعث ثمربخش بودن/شدن یک سازمان میگردد؟ مدیریت مطلوب؟ پرسنل خوب؟ برنامه ریزی صحیح؟ تعادل و بقاء آن سازمان؟ سودآوری؟ انعطاف پذیری آن سازمان؟ براستی ملاکها و معیارهای صحیح سنجش و اندازه گیری ثمربخشی (Effectiveness) یک سازمان بنادر چیست؟ و چگونه میتوان ثمربخشی (Effectiveness) یک سازمان بنادر را اندازه گرفت؟ در صورتیکه ۲۰-۱۰ دقیقه از وقت ارزشمندتان را در اختیار ما قرار دهید، ما قادر خواهیم بود به بعضی از این سوالات برای تکمیل بخشی از تحقیق مان پاسخ دهیم.

ما به مساعدت و همکاری شما برای انجام یک تحقیق عملی که نهایتاً به نفع سازمانهای بنادر خواهد بود نیاز داریم. طبیعی است که همه ما خواستار سازمانهای بنادری ثمربخش (Effective) که بتوانند با موفقیت هر چه تمامتر با مشکلات احتمالی موجود در بخش دریائی مقابله نمایند می باشیم. در حال حاضر کلیه سازمانهای بنادر به یک روش یا مدل برای سنجش و اندازه گیری ثمربخشی سازمانی شان (Organisational Effectiveness) نیاز دارند تا قادر باشند تواناییها و نقطه ضعفهای درون سازمانی، و فرصتها و تهدیدات برون سازمانی را شناسائی نمایند.

برای عملی شدن چنین امری، تعدادی از فاکتورهای کلیدی که بر روی ثمربخشی (Effectiveness) هر سازمان بنادری تاثیر می گذارند شناسائی گردیده است (لازم به ذکر است که این فاکتورها مربوط به کارآئی بخش عملیاتی Operational Performance سازمانها نمی باشند، بلکه فقط مربوط به ثمربخشی Effectiveness اداره سازمانهای بنادر می گردند). با استفاده از فاکتورهای شناسائی شده، یک مدل سیستماتیک ثمربخشی سازمانی،

**A System-Based Model of Organisational Effectiveness (OE)**، برای سنجش ثمربخشی سازمانی (OE) در سازمانهای بنادر طراحی گردیده است. اگر ملاکها و معیارهای (یا فاکتورهای) صحیحی در مدل بکار گرفته شده باشند، نتیجه سنجش ثمربخشی سازمانی (OE) در یک سازمان بنادر، با استفاده از این مدل، وضعیت آن سازمان را از نظر ثمربخشی (Effectiveness) نشان خواهد داد. که این نتیجه به نوبه خود می تواند به عنوان راهنمایی برای افزایش ثمربخشی آن سازمان در آینده استفاده گردد. حال با توجه به توضیحات فوق، مساعدت، وقت و بینش شما می تواند کمک بزرگی در جهت آزمایش این مدل (صحیح یا ناصحیح بودن ملاکهای در نظر گرفته شده در مدل) باشد.

یک نسخه پرسشنامه به پیوست برای کلیه مدیران، سرپرستان و مسئولین محترم ادارات مختلف آن سازمان محترم ارسال می گردد. بدلیل موقعیت شغلی و مدیریتی که دارا میباشید، جنابعالی می توانید اطلاعات مهم و مفیدی در زمینه سنجش و ارزیابی ثمربخشی (Effectiveness) در سازمانهای بنادر در اختیار این پروژه تحقیقاتی قرار دهید.

تکمیل این پرسشنامه کاملاً داوطلبانه می باشد، و در صورت همکاری، پاسخهای شما کاملاً محرمانه تلقی خواهد گردید و برای هیچ منظوری غیر از این پروژه تحقیقاتی استفاده نخواهد شد.



Reference:

در صورت بروز هر گونه مشکل یا سوالی در خصوص پرسشنامه پیوست می توانید با هماهنگ کننده این تحقیق (موبایل: ۰۹۱۵-۱۴۵۰۰۷۸ یا پست الکترونیکی [J.Savareh@amc.edu.au](mailto:J.Savareh@amc.edu.au)) تماس بگیرید. ضمناً هماهنگ کننده این تحقیق در تاریخ / ۸۳ در آن سازمان محترم حضور خواهد یافت تا در خصوص هدفهای این تحقیق توضیحات لازم را ارائه و به پرسشهای احتمالی پاسخ دهد و پرسشنامه های تکمیل شده را جمع آوری نماید. لازم بذکر است که کلیه اطلاعات جمع آوری شده بمدت پنج سال در بایگانی دانشگاه نگهداری خواهند شد و پس از آن منهدم خواهند گردید.

خلاصه ای از نتایج بدست آمده، پس از جمع آوری و تجزیه و تحلیل اطلاعات، به مدیریت محترم هر اداره ارسال خواهد شد.

این پروژه تحقیقاتی در بخش تجارت دریائی، دانشکده حمل و نقل و مهندسی دریائی، کالج دریائی استرالیا

**(Department of Maritime Business, Faculty of Maritime Transport and Engineering, Australian Maritime College, AMC)**

در حال انجام می باشد و از کمیته تحقیقات انسانی علوم اجتماعی تاسمانیا تاییدیه دریافت نموده است. در نتیجه، در صورت داشتن هر گونه سوالی در خصوص جنبه های اخلاقی جمع آوری اطلاعات می توانید با مسئول اجرایی کمیته فوق تماس حاصل نمایید. مسئول اجرایی کمیته تحقیقات انسانی علوم اجتماعی تاسمانیا خانم آمندا مک اولی تلفن ۶۲۲۶۲۷۶۳ ۳ ۶۱ + پست الکترونیکی [Amanda.McAulley@utas.edu.au](mailto:Amanda.McAulley@utas.edu.au) می باشند.

در پایان، از همکاری صمیمانه و وقت گرانبهای جنابعالی و مساعدت سازمان مربوطه برای به ثمر رسیدن این پروژه تحقیقاتی کمال تشکر و امتنان را داریم

با احترام

جعفر سیاره

پروفسور بری لوارن

هماهنگ کننده پروژه تحقیقاتی  
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تلفن: ۴۷۱۳ ۶۳۳۵ ۳ ۶۱ +  
Email: [B.Lewarn@amc.edu.au](mailto:B.Lewarn@amc.edu.au)

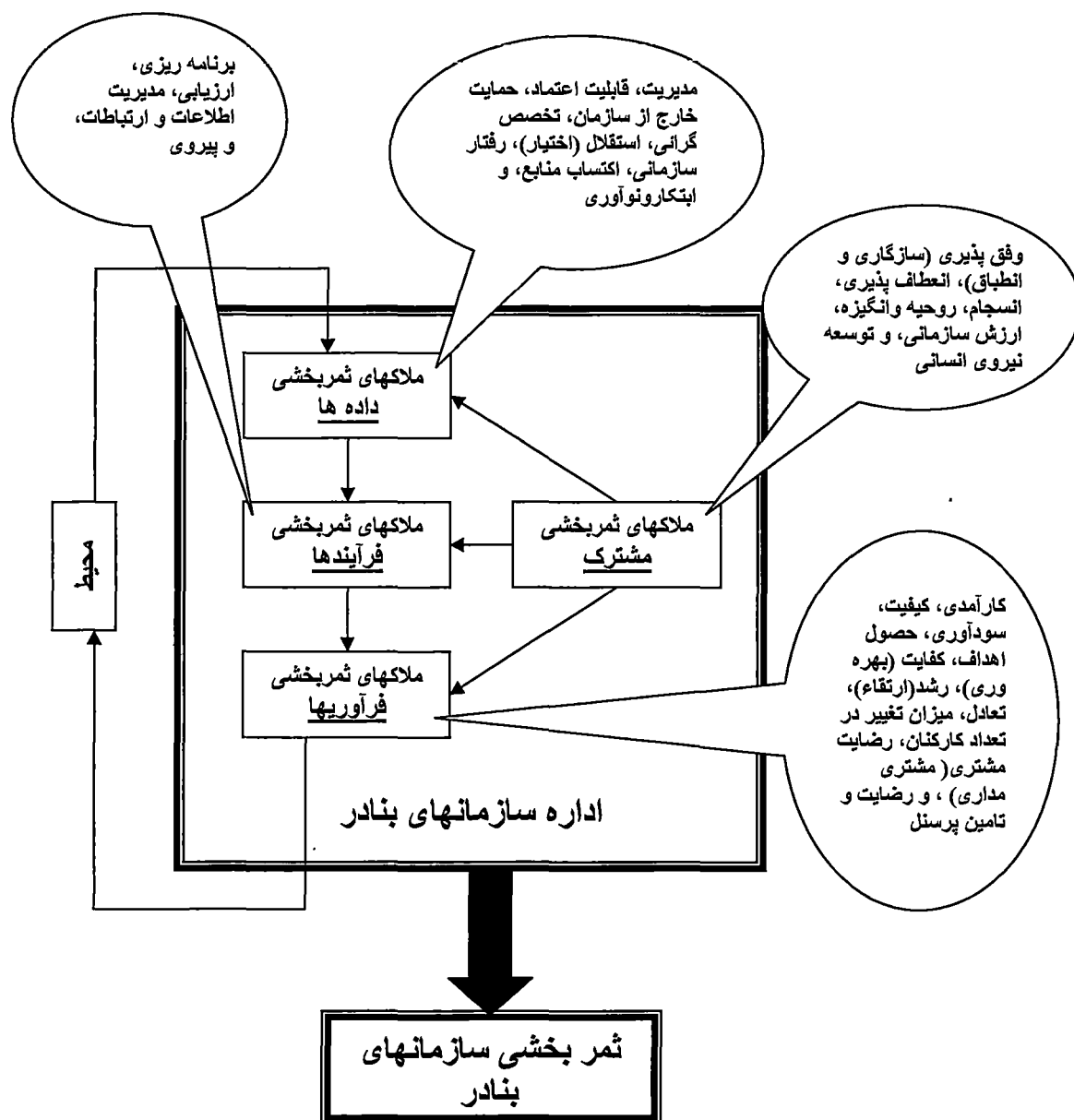
## Appendix 6: Questionnaire (Persian)

پرسشنامه

## مدل فرضی ثمر بخشی سازمانی (OE) برای سازمانهای بنادر

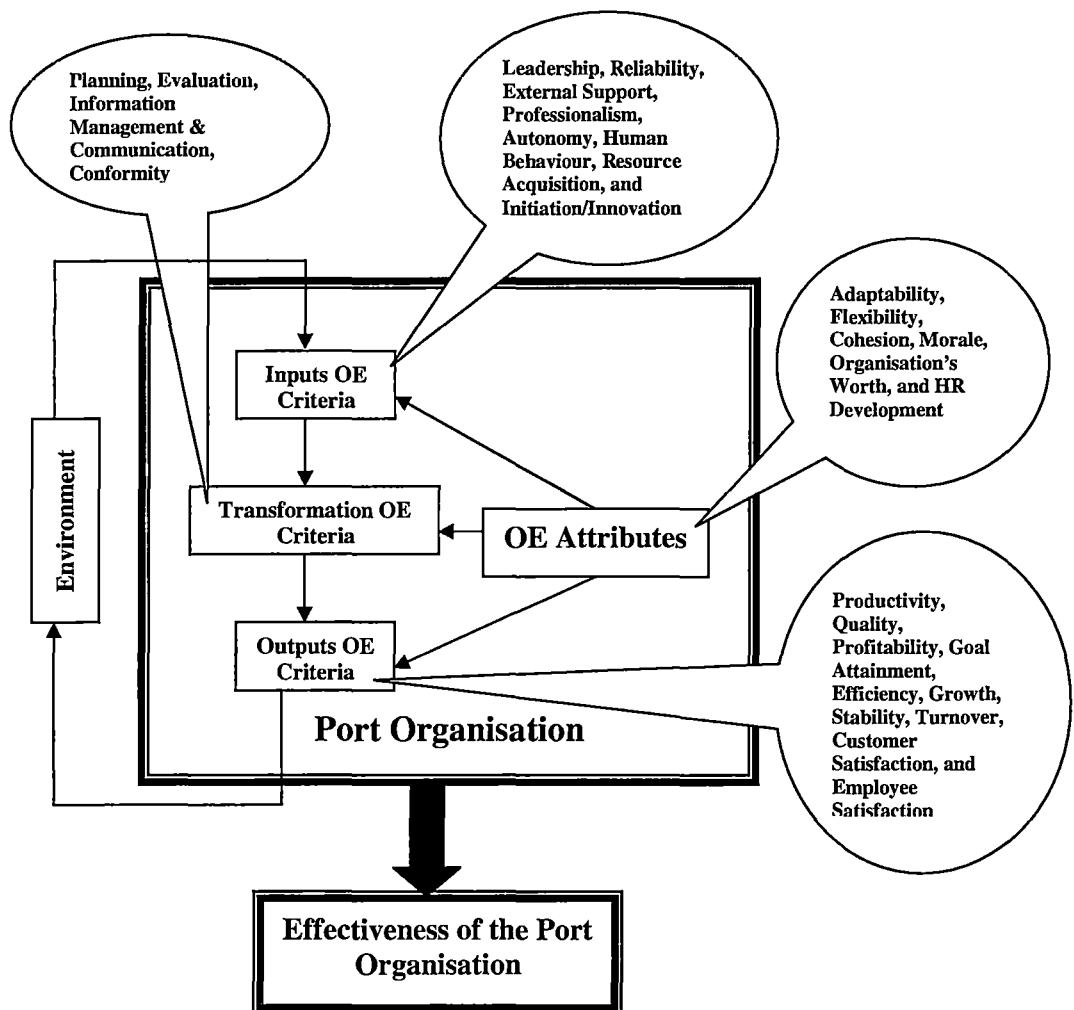
**تعریف ثمر بخشی سازمانی:** توانایی یک سازمان، بعنوان یک سیستم، در کسب منابع (انسانی و غیر انسانی) برای رسیدن به اهداف نهائی خود (تولید یا انجام خدمات) بدون از دست دادن این منابع در مسیر رسیدن به اهداف و بدون وارد کردن هرگونه فشاری غیر ضروری بر پرسنل.

**مدل:** شکل زیر یک مدل فرضی سیستماتیک ثمر بخشی سازمانی (OE) را نشان می دهد. کلیه سازمانها بنادر سیستمهای باز می باشند و از بخشها و فرآیندهای وابسته به یکدیگر تشکیل شده اند که در سیستم بزرگتری فعال بوده و با محیط خود بطور پویا ارتباط برقرار می نمایند. این مدل بر اساس پروسه ساده داده ها-فرآیندها-فرآوریها طراحی گردیده است که در آن فاکتورهای (یا ملاکهای) ثمر بخشی سازمانی، که از نظر سازمان های بنادر مهم می باشند، به سه فاز اصلی (داده ها-فرآیندها-فرآوریها) تقسیم گردیده اند. ضمناً ملاک هایی که بنظر می رسد در هر سه فاز یک سیستم سازمان بنادر ثمر بخش مهم باشند نیز بعنوان ملاکهای مشترک فرض گردیده اند.



## Hypothetical Organisational Effectiveness (OE) Model for Port Organisations

The hypothesised system model of OE is shown below. All organisations (including port organisations) are open systems that made up of interdependent components (sub-systems) and processes, and that operate within larger systems and dynamically interact with their environment. The model is based on a simple process of **inputs-transformation-outputs**. The effectiveness criteria, which are assumed to be important for port organisations, are then grouped into three phases (functions) of a system (inputs-transformation-outputs). Meanwhile, those criteria, which are determined to be important and necessary for effective processes of all three functions, are hypothesised and grouped as common OE criteria (OE Attributes).



## بخش الف

### قسمت اول: داده ها

لطفاً، با توجه به تعاریف هر یک از ملاکهای فوق، با قرار دادن یک (✓) به قسمت اول هر سوال پاسخ دهید. اگر جواب شما به قسمت اول "خیر" میباشد، با کشیدن خط دور یکی از فازها (۱، ۲، ۳، و یا ۴) در قسمت دوم هر سوال نظر خود را بیان کنید.

فازها

اصلی ملاک تمربخشی (OE) نمی باشد

فرآیندها  
مشترک  
۴      ۳      ۲      ۱

۱. آیا مدیریت ملاک صحیحی از تمربخشی در فاز داده ها می باشد؟

۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۴      ۳      ۲      ۱



۲. آیا قابلیت اعتماد (به کارکنان) ملاک صحیحی از تمربخشی در فاز داده ها می باشد؟

۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۴      ۳      ۲      ۱



۳. آیا حمایت خارج از سازمان ملاک صحیحی از تمربخشی در فاز داده ها می باشد؟

۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۴      ۳      ۲      ۱



۴. آیا تخصیص گرانی ملاک صحیحی از تمربخشی در فاز داده ها می باشد؟

۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۴      ۳      ۲      ۱



۵. آیا استقلال (اختیار) ملاک صحیحی از تمربخشی در فاز داده ها می باشد؟

۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۴      ۳      ۲      ۱





۶. آیا رفتار سازمانی ملاک صحیحی از ثمربخشی در فاز داده ها می باشد؟
۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۱      ۲      ۳      ۴  
↓
۷. آیا اکتساب منابع ملاک صحیحی از ثمربخشی در فاز داده ها می باشد؟
۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۱      ۲      ۳      ۴  
↓
۸. آیا ابتکار و نوآوری ملاک صحیحی از ثمربخشی در فاز داده ها می باشد؟
۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۱      ۲      ۳      ۴
۹. آیا می توانید از خودتان ملاک یا ملاکهایی به لیست فوق، در فاز داده ها، اضافه نمائید که به نظر شما می توانند در ثمربخشی یک سازمان بنادر موثر باشند؟
۱. ☐ بلی      ۲. ☐ خیر  
↓  
اگر جواب بلی است، آنها را نام ببرید.....

## قسمت دوم: فرایندها

لطفاً، با توجه به تعاریف هر یک از ملاکهای فوق، با قرار دادن یک (✓) به قسمت اول هر سوال پاسخ دهید. اگر جواب شما به قسمت اول "خیر" میباشد، با کشیدن خط دور یکی از فازها (۱، ۲، ۳، و یا ۴) در قسمت دوم هر سوال نظر خود را بیان کنید.

### فازها

اصلی ملاک تمریناتی (OE) نمی باشد

داده ها  
فرآورده ها  
مشترک

۱. آیا برنامه ریزی ملاک صحیحی از تمریناتی در فاز فرایندها می باشد؟
 

۱. بلی

۲. خیر

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟

۱

۲

۳

۴

↓
۲. آیا ارزیابی ملاک صحیحی از تمریناتی در فاز فرایندها می باشد؟
 

۱. بلی

۲. خیر

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟

۱

۲

۳

۴

↓
۳. آیا مدیریت اطلاعات و ارتباطات ملاک صحیحی از تمریناتی در فاز فرایندها می باشد؟
 

۱. بلی

۲. خیر

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟

۱

۲

۳

۴

↓
۴. آیا پیروی ملاک صحیحی از تمریناتی در فاز فرایندها می باشد؟
 

۱. بلی

۲. خیر

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟

۱

۲

۳

۴
۵. آیا می توانید از خودتان ملاک یا ملاکهایی به لیست فوق، در فاز فرایندها، اضافه نمائید که به نظر شما می توانند در تمریناتی یک سازمان بنادر موثر باشند؟
 

۱. بلی

۲. خیر

↓

اگر جواب بلی است، آنها را نام ببرید.....

## قسمت سوم: فرآوریه‌ها

لطفاً، با توجه به تعاریف هر یک از ملاکهای فوق، با قرار دادن یک (✓) به قسمت اول هر سوال پاسخ دهید. اگر جواب شما به قسمت اول "خیر" می‌باشد، با کشیدن خط دور یکی از فازها (۱، ۲، ۳، و یا ۴) در قسمت دوم هر سوال نظر خود را بیان کنید.

### فازها

اصل ملاک اثربخشی (OE) نمی باشد

داده ها      فرآیندها      مشورت      اصل ملاک اثربخشی (OE) نمی باشد

۱. آیا کارآمدی (Productivity) ملاک صحیحی از اثربخشی در فاز فرآوریه‌ها می باشد؟
 

۱. بلی ☐ ۲. خیر ☐

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟
 

۱۲۳۴

↓
۲. آیا کیفیت ملاک صحیحی از اثربخشی در فاز فرآوریه‌ها می باشد؟
 

۱. بلی ☐ ۲. خیر ☐

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟
 

۱۲۳۴

↓
۳. آیا سودآوری ملاک صحیحی از اثربخشی در فاز فرآوریه‌ها می باشد؟
 

۱. بلی ☐ ۲. خیر ☐

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟
 

۱۲۳۴

↓
۴. آیا حصول اهداف ملاک صحیحی از اثربخشی در فاز فرآوریه‌ها می باشد؟
 

۱. بلی ☐ ۲. خیر ☐

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟
 

۱۲۳۴

↓
۵. آیا کفایت (بهره وری) ملاک صحیحی از اثربخشی در فاز فرآوریه‌ها می باشد؟
 

۱. بلی ☐ ۲. خیر ☐

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟
 

۱۲۳۴

↓
۶. آیا رشد (ارتقاء) ملاک صحیحی از اثربخشی در فاز فرآوریه‌ها می باشد؟
 

۱. بلی ☐ ۲. خیر ☐

اگر جواب خیر است، پس به کدام فاز تعلق دارد؟
 

۱۲۳۴

↓

۷. آیا تعداد ملاک صحیحی از ثمربخشی در فاز فرآوریه‌ها می باشد؟
۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۱      ۲      ۳      ۴  
↓
۸. آیا میزان تغییر در تعداد کارکنان (Turnover) ملاک صحیحی از ثمربخشی در فاز فرآوریه‌ها می باشد؟
۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۱      ۲      ۳      ۴  
↓
۹. آیا رضایت مشتری ملاک صحیحی از ثمربخشی در فاز فرآوریه‌ها می باشد؟
۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۱      ۲      ۳      ۴  
↓
۱۰. آیا رضایت و تامین پرسنل ملاک صحیحی از ثمربخشی در فاز فرآوریه‌ها می باشد؟
۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز تعلق دارد؟      ۱      ۲      ۳      ۴
۱۱. آیا می توانید از خودتان ملاک یا ملاک‌هایی به لیست فوق، در فاز فرآوریه‌ها، اضافه نمائید که به نظر شما می توانند در ثمربخشی یک سازمان بنادر موثر باشند؟
۱. ☐ بلی      ۲. ☐ خیر  
↓  
اگر جواب بلی است، آنها را نام ببرید.....

## قسمت چهارم: ملاکهای مشترک

لطفاً، با توجه به تعاریف هر یک از ملاکهای فوق، با قرار دادن یک (✓) به قسمت اول هر سوال پاسخ دهید. اگر جواب شما به قسمت اول "خیر" میباشد، با کشیدن خط دور یکی یا بیشتر از یکی از فازها (۱، ۲، ۳، و یا ۴) در قسمت دوم هر سوال نظر خود را بیان کنید.

### فازها

اصلاً ملاک ثمربخشی (OE) نمی باشد

فرآیندها  
فرآوردها  
داده ها

۱. آیا به نظر شما می توان وفق پذیری (سازگاری و انطباق) را بعنوان یک ملاک مشترک ثمربخشی در هر ۳ فاز (داده ها-فرآیندها-فرآوردها) یک سیستم سازمان بنادر در نظر گرفت؟

۱. ☐ بلی    ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز(ها) تعلق دارد؟  
↓  
۴    ۳    ۲    ۱

۲. آیا به نظر شما می توان انعطاف پذیری را بعنوان یک ملاک مشترک ثمربخشی در هر ۳ فاز (داده ها-فرآیندها-فرآوردها) یک سیستم سازمان بنادر در نظر گرفت؟

۱. ☐ بلی    ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز(ها) تعلق دارد؟  
↓  
۴    ۳    ۲    ۱

۳. آیا به نظر شما می توان انسجام را بعنوان یک ملاک مشترک ثمربخشی در هر ۳ فاز (داده ها-فرآیندها-فرآوردها) یک سیستم سازمان بنادر در نظر گرفت؟

۱. ☐ بلی    ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز(ها) تعلق دارد؟  
↓  
۴    ۳    ۲    ۱

۴. آیا به نظر شما می توان روحیه و انگیزه را بعنوان یک ملاک مشترک ثمربخشی در هر ۳ فاز (داده ها-فرآیندها-فرآوردها) یک سیستم سازمان بنادر در نظر گرفت؟

۱. ☐ بلی    ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز(ها) تعلق دارد؟  
↓  
۴    ۳    ۲    ۱

۵. آیا به نظر شما می توان ارزش سازمانی را بعنوان یک ملاک مشترک ثمربخشی در هر ۳ فاز (داده ها-فرآیندها-فرآوریهها) یک سیستم سازمان بنادر در نظر گرفت؟

۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز(ها) تعلق دارد؟  
↓

۶. آیا به نظر شما می توان توسعه نیروی انسانی را بعنوان یک ملاک مشترک ثمربخشی در هر ۳ فاز (داده ها-فرآیندها-فرآوریهها) یک سیستم سازمان بنادر در نظر گرفت؟

۱. ☐ بلی      ۲. ☐ خیر ← اگر جواب خیر است، پس به کدام فاز(ها) تعلق دارد؟  
↓

۷. آیا می توانید از خودتان ملاک یا ملاکهایی به لیست فوق، در فاز مشترک، اضافه نمائید که به نظر شما می توانند در ثمربخشی یک سازمان بنادر موثر باشند؟

۱. ☐ بلی      ۲. ☐ خیر



اگر جواب بلی است، آنها را نام ببرید.....

لطفاً دور یکی از اعدادی که بهترین نظر شما را در رابطه با اظهارات زیر تامین می نماید خط بکشید.

لطفاً توجه فرمائید که ۵ جواب احتمالی (۱ تا ۵) برای هر قسمت وجود دارد که ۵ به معنی "کاملاً موافق" و ۱ به معنی "کاملاً مخالف" می باشند.

کاملاً موافق	موافق	احتمالاً موافق	مخالف	کاملاً مخالف	
۵	۴	۳	۲	۱	۱. سازمانهای بنادر بایستی ثمربخشی سازمانی شان (OE) را بطور منظم (مثلاً سالانه) ارزیابی و اندازه گیری نمایند.
۵	۴	۳	۲	۱	۲. یک مدل ثمربخشی سازمانی (OE) سیستماتیک (ارائه شده در این تحقیق) وسیله کاملاً مناسبی برای اندازه گیری ثمربخشی در یک سازمان بنادر است.
۵	۴	۳	۲	۱	۳. اندازه گیری ثمربخشی سازمانی (OE) بصورت منظم (مثلاً سالانه) وضعیت یک سازمان بنادر را از نظر ثمربخشی نشان خواهد داد.
۵	۴	۳	۲	۱	۴. نتیجه بررسی و اندازه گیری ثمربخشی سازمانی (OE) بصورت منظم (مثلاً سالانه) میتواند به عنوان راهنمایی برای افزایش ثمربخشی یک سازمان بنادر در آینده استفاده گردد.
۵	۴	۳	۲	۱	۵. نتیجه بررسی و اندازه گیری ثمربخشی سازمانی (OE) بصورت منظم (مثلاً سالانه) میتواند به عنوان راهنمایی برای برنامه ریزی استراتژیک (طولانی مدت) در آینده یک سازمان بنادر استفاده گردد.
۵	۴	۳	۲	۱	۶. نتیجه بررسی و اندازه گیری ثمربخشی سازمانی (OE) بصورت منظم (مثلاً سالانه)، نقاط ضعف و قوت یک سازمان بنادر را نشان خواهد داد.
۵	۴	۳	۲	۱	۷. هر چه ثمربخشی یک سازمان بنادر بیشتر باشد، کارکرد عملیاتی بنادرش بالاتر خواهد بود.

۸. بالاتر بودن کارکرد عملیاتی بنادر در نتیجه بالا بودن ثمربخشی سازمان شان، تاثیر مثبت بر روی توسعه ملی دارد.
- ۱ ۲ ۳ ۴ ۵
۹. بالاتر بودن کارکرد عملیاتی بنادر در نتیجه بالا بودن ثمربخشی سازمان شان، کمک به توسعه اجتماعی-اقتصادی ملی می نماید.
- ۱ ۲ ۳ ۴ ۵
۱۰. بالاتر بودن کارکرد عملیاتی بنادر در نتیجه بالا بودن ثمربخشی سازمان شان، کمک به افزایش سهم کشور در صنعت ترانزیت بین المللی می نماید.
- ۱ ۲ ۳ ۴ ۵
۱۱. بالاتر بودن کارکرد عملیاتی بنادر در نتیجه بالا بودن ثمربخشی سازمان شان، کمک به کسب برتری رقابتی کشور در زمینه دریائی در منطقه می نماید (خصوصاً در بین کشورهای حوزه خلیج فارس).
- ۱ ۲ ۳ ۴ ۵



## بخش ج

### اطلاعات عمومی

لطفاً با قرار دادن (✓) یا پر کردن جای خالی به سوالات زیر پاسخ دهید.

۱. لطفاً بالاترین مدرک دانشگاهی که به پایان رسانده اید را در زیر نشان دهید.

□۱. دکتری      □۲. کارشناسی ارشد      □۳. کارشناسی

۲. در حال حاضر در کدام شعبه یا بخش از سازمان مشغول خدمت هستید؟

□۱. سازمان مرکزی      □۲. بندر عباس      □۳. بندر امام خمینی(ره)

□۴. بندر بوشهر      □۵. بندر انزلی      □۶. بندر نوشهر

□۷. بندر چابهار

۳. چند سال در این شعبه خدمت نموده اید؟.....سال

۴. چند سال در این سازمان خدمت نموده اید؟.....سال

۵. عنوان شغل/موقعیت/پست سازمانی جنابعالی چیست (اختیاری)؟.....

۶. چند سال در این پست بوده اید (اختیاری)؟.....سال

۷. به نظر شما هر چند مدت یک بار ثمربخشی سازمانی در یک سازمان بنادر بایستی اندازه گیری شود؟

□۱. هر شش ماه      □۲. هر سال      □۳. هر دو سال      □۴. هر پنج سال

۸. آیا جنابعالی، به عنوان یک مدیر، در آینده از مدل فرضی ارائه شده در این تحقیق برای اندازه گیری ثمربخشی سازمانی در سازمان/شعبه/بخش خود استفاده خواهید کرد؟

□۱. بلی      □۲. خیر

## **Appendix 7: OE Criteria Definitions (Persian)**

## تعاریف ملاکها در فاز داده ها

۱	مدیریت	اهمیت هدایت کردن و دادن تصویری گسترده از آینده به اعضاء سازمان و اعضاء سازمانهای مرتبط
۲	قابلیت اعتماد (به کارکنان)	میزان برآورده شدن اهداف سازمانی توسط پرسنل بدون نیاز به پیگیری و بررسی توسط مافوق
۳	حمایت خارج از سازمان	میزان حمایت یک سازمان از طرف دولت؛ یا میزان توجه و علاقه دولت به بهبودی سازمان
۴	تخصص گرایی	میزان اطلاعات افراد درباره صنعت دریائی، خود سازمان و اعضایش، و مشکلات سازمان قبل از انجام هرگونه اقدامی
۵	استقلال (اختیار)	استقلال، اختیار و خودمختاری در کار و محل کار در خصوص مالکیت، کنترل و تصمیم گیری
۶	رفتار سازمانی	میزان پذیرش اهداف سازمان توسط اعضایش، و تعهد اعضاء در جهت رسیدن به آن اهداف
۷	اکتساب منابع	توانائی یک سازمان در استقرار ارتباط موفقیت آمیز با محیطش در جهت کسب منابع ارزشمند و نادر (انسانی و غیر انسانی) لازم برای عملیات تمرینش آن سازمان
۸	ابتکار و نوآوری	میزان ابداع و ابتکار در افکار، ایده ها و شیوه ها، و همچنین درجه حمایت این ایده ها (ابداعی و حلاقی) از طرف سازمان

## تعاریف ملاکها در فاز فرآیندها

۱	برنامه ریزی	میزان توانائی یک سازمان در مقابله با مسائل اضطرابی، و در تمرکز بر روی اهداف اولیه؛ یا درجه توانائی یک سازمان در برنامه ریزی سیستماتیک برای آینده
۲	ارزیابی	ارزیابی و سنجش سازمان یا بخشهایی از سازمان توسط اشخاص یا گروههایی که با سازمان رابطه مستقیم دارند (مانند: مشتریان، سهامداران، مدیران، شرکتهای تدارکاتی، و مردم بطور کلی)
۳	مدیریت اطلاعات و ارتباطات	تمامیت (کمال)، کارائی، و دقت در تجزیه و تحلیل و توزیع اطلاعات؛ میزان جریان روان اطلاعات کاری و ارتباطات در داخل سازمان
۴	پیروی	میزان پاسخگویی کارائی (Performance) به معیارهای یک سیستم اجتماعی

## تعاریف ملاکها در فاز فرآوریهها

۱	کازآمدی (Productivity)	میزان موفقیت آمیز بودن (پربار بودن) یک سازمان در زمینه تولید محصولات یا خدمات
۲	کیفیت	کیفیت محصولات یا خدمات تولید شده توسط سازمان
۳	سودآوری	میزان سودآوری یک سازمان پس از کسر کلیه هزینه های اجباری الزامی
۴	حصول اهداف	میزان اهمیت و ارزش دادن یک سازمان برای رسیدن به اهداف اصلی اش
۵	کفایت (بهره وری)	توانائی در حصول نتایج مطلوب با حداقل هزینه ها (مالی، زمانی، و نیروی انسانی)
۶	رشد (ارتقاء)	افزایش در متغیرهایی مانند کل نیروی کار، ظرفیت تجهیزات، دارائی ها، فروش، سودها، سهام، و تعداد ابداعات (رشد مقایسه ای است از وضعیت کنونی سازمان با وضعیت گذشته اش)
۷	تعادل	حفظ و نگهداری ساختار، عملکرد، و منابع در گذر زمان و بخصوص در ایام تنشها و فشارهای درون و برون سازمانی
۸	میزان تغییر در تعداد کارکنان (Turnover)	میزان نسبی تعداد/نرخ کارکنانی که سازمان را داوطلبانه ترک می کنند به استخدام شده ها و مانده ها
۹	رضایت مشتری (مداری)	میزان اهمیت دادن سازمان به رضایت مشتری
۱۰	رضایت و تامین پرسنل	میزان اهمیت دادن سازمان به رضایت پرسنل

## تعاریف ملاکهای مشترک

۱	وفق پذیری (سازگاری و انطباق)	میزان واکنش یک سازمان به وضعیتهای مختلف و متغیر (محیطی و مشکلات داخلی) و وفق پذیری به فشارهای خارجی؛ قابلیت پذیرش و دستخوش تجدید سازمانی (Reorganisation) شدن در واکنش به فشارهای محیطی مزمن که موانع دائمی بر عملیات سازمان تحمیل می نمایند
۲	انعطاف پذیری	توانائی و قابلیت پذیرش تجدید سازمانی (Reorganisation) موقت یا سازگاری تحت فشارهای حساس و غیر عادی از محیطهای داخلی و خارجی
۳	انسجام	میزان انسجام بین کارکنان یک سازمان مانند وجود رابطه دوستانه بین کارکنان، خوب کار کردن با یکدیگر، ارتباط کامل و بدون واسطه، و تشریک مساعی در کارها
۴	روحیه و انگیزه	یک پدیده گروهی است که شامل تلاش فوق العاده، اهداف مشترک و گروهی، تعهد و احساس متعلق بودن می باشد
۵	ارزش سازمانی	میزان ارزش و اهمیت یک سازمان از دیدگاه کارکنانش؛ و یک سازمان و کارکنانش از دیدگاه جامعه (ارزش سازمان از دیدگاه تک تک اعضایش، و سازمان و تک تک اعضایش از دیدگاه جامعه)
۶	توسعه نیروی انسانی	مقدار تلاش وقف شده توسط سازمان در توسعه نیروی انسانی (مانند آموزش، ...)

## Appendix 8: Codebook

### Codebook

Col. No.	Q. No.	Variable Name	Response Pattern	Code
1-3		ID	Actual	Actual
4	A11	Leadership	Yes No/Transfo. No/Output No/Attribute No/Not OE	1 2 3 4 5
5	A12	Reliability	Yes No/Transfo. No/Output No/Attribute No/Not OE	1 2 3 4 5
6	A13	External support	Yes No/Transfo. No/Output No/Attribute No/Not OE	1 2 3 4 5
7	A14	Professionalism	Yes No/Transfo. No/Output No/Attribute No/Not OE	1 2 3 4 5
8	A15	Autonomy	Yes No/Transfo. No/Output No/Attribute No/Not OE	1 2 3 4 5
9	A16	Human behaviour	Yes No/Transfo. No/Output No/Attribute No/Not OE	1 2 3 4 5
10	A17	Resource acquisition	Yes No/Transfo. No/Output No/Attribute No/Not OE	1 2 3 4 5
11	A18	Initiation/Innovation	Yes No/Transfo. No/Output No/Attribute No/Not OE	1 2 3 4 5
12-13	A19	Input Sugg.	No Yes/HR Dev. Yes/Flexibility Yes/Emplo. Satis. Yes/Customer Satis. Yes/Self-esteem Yes/Quality	01 02 03 04 05 06 07

			Yes/Supervision	08
			Yes/Org. Discipline	09
			Yes/Planning	10
			Yes/Job Security	11
			Yes/Evaluation	12
			Yes/Info. Man. & Com.	13
			Yes/Org. Worth	14
			Yes/Stability	15
			Yes/Reward Man.	16
			Yes/Morale	17
			Yes/Cohesion	18
			Not Applicable	88
			No response	99
14-15	A19	Input Sugg. 1	Same as Input Sugg.	Codes as in Input Sugg.
16-17	A19	Input Sugg. 2	Same as Input Sugg.	Codes as in Input Sugg.
18	A21	Planning	Yes	1
			No/Input	2
			No/Output	3
			No/Attribute	4
			No/Not OE	5
19	A22	Evaluation	Yes	1
			No/Input	2
			No/Output	3
			No/Attribute	4
			No/Not OE	5
20	A23	Info. Man. & Com.	Yes	1
			No/Input	2
			No/Output	3
			No/Attribute	4
			No/Not OE	5
21	A24	Conformity	Yes	1
			No/Input	2
			No/Output	3
			No/Attribute	4
			No/Not OE	5
22-23	A25	Transfo. Sugg.	No	01
			Yes/HR Dev.	02
			Yes/Flexibility	03
			Yes/Emplo. Satis.	04
			Yes/Customer Satis.	05
			Yes/Self-esteem	06
			Yes/Quality	07
			Yes/Supervision	08
			Yes/Human Beh.	09
			Yes/Reliability	10
			Yes/Standardisation	11
			Yes/Risk-taking	12
			Yes/External Support	13
			Yes/Competition	14
			Yes/Leadership	15
			Yes/Efficiency	16
			Yes/Growth	17
			Yes/Professionalism	18
			Yes/Res. Acquis.	19
			Yes/Innovation	20
			Yes/Turnover	21
			Yes/Emplo. Involv.	22

			Not Applicable No Response	88 99
24-24	A25	Transfo. Sugg. 1	Same as Transfo. Sugg.	Codes as in Transo. Sugg.
26-27	A25	Transfo. Sugg. 2	Same as Transfo. Sugg.	Codes as in Transo. Sugg.
28	A31	Productivity	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
29	A32	Quality	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
30	A33	Profitability	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
31	A34	Turnover	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
32	A35	Goal Attainment	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
33	A36	Efficiency	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
34	A37	Growth	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
35	A38	Stability	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
36	A39	Customer Satis.	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5
37	A310	Employ. Satis.	Yes No/Input No/Transfo. No/Attribute No/Not OE	1 2 3 4 5

38-39	A311	Output Sugg.	No	01
			Yes/HR Dev.	02
			Yes/Flexibility	03
			Yes/Human Beh.	04
			Yes/Standardisation	05
			Yes/Evaluation	06
			Yes/Info. Man. & Com.	07
			Yes/Competition	08
			Yes/Morale	09
			Yes/Emplo. Involv.	10
			Yes/Org. Worth	11
			Yes/Cohesion	12
			Not Applicable	88
			No Response	99
40-41	A311	Output Sugg. 1	Same as Output Sugg.	Codes as in Output Sugg.
42-43	A311	Output Sugg. 2	Same as Output Sugg.	Codes as in Output Sugg.
44	A41	Adaptability	Yes	1
			No/Input	2
			No/Transfo.	3
			No/Output	4
			No/Not OE	5
			No/I & T	6
			No/I & O	7
			No/T & O	8
45	A42	Flexibility	Yes	1
			No/Input	2
			No/Transfo.	3
			No/Output	4
			No/Not OE	5
			No/I & T	6
			No/I & O	7
			No/T & O	8
46	A43	Cohesion	Yes	1
			No/Input	2
			No/Transfo.	3
			No/Output	4
			No/Not OE	5
			No/I & T	6
			No/I & O	7
			No/T & O	8
47	A44	Morale	Yes	1
			No/Input	2
			No/Transfo.	3
			No/Output	4
			No/Not OE	5
			No/I & T	6
			No/I & O	7
			No/T & O	8
48	A45	Org. Worth	Yes	1
			No/Input	2
			No/Transfo.	3
			No/Output	4
			No/Not OE	5
			No/I & T	6
			No/I & O	7
			No/T & O	8
49	A46	HR Dev.	Yes	1

			No/Input	2
			No/Transfo.	3
			No/Output	4
			No/Not OE	5
			No/I & T	6
			No/I & O	7
			No/T & O	8
50-51	A47	Attribute Sugg.	No	01
			Yes/Emplo. Satis.	02
			Yes/Customer Satis.	03
			Yes/Evaluation	04
			Yes/Human Beh.	05
			Yes/Org. Discipline	06
			Yes/Innovation	07
			Yes/Planning	08
			Yes/Professionalism	09
			Yes/Res. Acquis.	10
			Yes/Stability	11
			Yes/Profitability	12
			Yes/Autonomy	13
			Yes/Risk-taking	14
			Not Applicable	88
			No Response	99
52-53	A47	Attribute Sugg. 1	Same as Attribute Sugg.	Codes as in Attribute Sugg.
54-55	A47	Attribute Sugg. 2	Same as Attribute Sugg.	Codes as in Attribute Sugg.
56	B1	Regular Assessment	Strongly Disagree	1
			Disagree	2
			Neutral	3
			Agree	4
			Strongly Agree	5
57	B2	Appropriate Model	Strongly Disagree	1
			Disagree	2
			Neutral	3
			Agree	4
			Strongly Agree	5
58	B3	OE Status of Port Organisation	Strongly Disagree	1
			Disagree	2
			Neutral	3
			Agree	4
			Strongly Agree	5
59	B4	Guide to Enhance OE	Strongly Disagree	1
			Disagree	2
			Neutral	3
			Agree	4
			Strongly Agree	5
60	B5	Guide for Strategic Planning	Strongly Disagree	1
			Disagree	2
			Neutral	3
			Agree	4
			Strongly Agree	5
61	B6	Strengths and Weaknesses	Strongly Disagree	1
			Disagree	2
			Neutral	3
			Agree	4
			Strongly Agree	5



62	B7	High OE, High Oper. Perf.	Strongly Disagree Disagree Neutral Agree Strongly Agree	1 2 3 4 5
63	B8	High Oper. Perf., +ve National development	Strongly Disagree Disagree Neutral Agree Strongly Agree	1 2 3 4 5
64	B9	High Oper. Perf., +ve National Socio-Economic Dev.	Strongly Disagree Disagree Neutral Agree Strongly Agree	1 2 3 4 5
65	B10	High Oper. Perf., High International Transit Trade	Strongly Disagree Disagree Neutral Agree Strongly Agree	1 2 3 4 5
66	B11	High Oper. Perf., Region Maritime Competitive Advantage	Strongly Disagree Disagree Neutral Agree Strongly Agree	1 2 3 4 5
67	C1	Education	Doctorate Master Bachelor	1 2 3
68	C2	PSO Branch	H.Q. Bandar Abbas B.I.K. Bushehr Anzali Noshahr Chabahar	1 2 3 4 5 6 7
69	C3	Years in Branch	1-5 6-10 11-15 16-20 20-25 Above 25 No Response	1 2 3 4 5 6 9
70	C4	Years in PSO	1-5 6-10 11-15 16-20 20-25 Above 25 No Response	1 2 3 4 5 6 9
71	C5	Position Title	Dept. Head 1 <sup>st</sup> Line Manager Middle Manager Top Manager No Response	1 2 3 4 9
72	C6	Years in Current Position	1-5 6-10 11-15 16-20	1 2 3 4

			20-25	5
			Above 25	6
			No Response	9
73	C7	Periodical OE Measurement	Biannually	1
			Annually	2
			Biennially	3
			Every 5 years	4
			No response	9
74	C8	Considering proposed OE Model	Yes	1
			No	2
			No Response	9

Appendix 9: Code sheets (Raw Data Matrix)

Code Sheet 1

Section A, Part 1 & 2

V1: ID      V2-V12: Input Criteria      V13-V19: Transformation Criteria

V1			V2-V12															V13-V19								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
0	0	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	0	1	0	1	0	1
0	0	2	1	1	1	1	1	1	1	1	8	8	8	8	8	8	1	1	1	5	0	7	8	8	9	9
0	0	3	1	1	5	1	1	1	3	1	0	2	8	8	8	8	1	1	1	5	8	8	8	8	8	8
0	0	4	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	4	1	0	1	0	1	0	1
0	0	5	4	2	1	2	1	1	1	2	0	3	9	9	9	9	1	1	4	1	0	8	8	8	9	9
0	0	6	4	1	4	1	1	1	1	1	0	1	0	1	0	1	1	1	4	1	0	1	0	1	0	1
0	0	7	1	4	1	1	1	1	1	1	0	2	1	1	0	4	1	4	4	4	1	0	9	9	9	9
0	0	8	1	3	1	2	3	4	1	3	8	8	8	8	8	8	1	1	1	3	8	8	8	8	8	8
0	0	9	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	4	0	1	0	1	0	1
0	1	0	4	1	4	1	1	4	1	4	1	0	9	9	9	9	1	1	1	1	1	1	9	9	9	9
0	1	1	4	4	5	4	4	4	5	4	0	1	0	1	0	1	4	1	4	5	0	1	0	1	0	1
0	1	2	2	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	2	1	3	8	8
0	1	3	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	2	3	0	1	0	1	0	1
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Code Sheet 2

Section A, Part 3 & 4

V1: ID                      V20-V32: Output Criteria                      V33-V41: Attribute Criteria

V1			V20-V32																V33-V41																	
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Code Sheet 3

Sections B & C  
V1: ID                      V42-V52: OE Impact                      V53-V60: General Info.

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## Appendix 10: Correlations Result

## Correlations

			Regular Assessment	Appropriate Model	OE Status of Port Organisation	Guide to Enhance OE	Guide for Strategic Planning	Strengths and Weaknesses
Spearman's rho	Regular Assessment	Correlation Coefficient	1.000	.222**	.241**	.175*	.087	.375*
		Sig. (2-tailed)	.	.003	.001	.019	.248	.000
		N	180	180	180	180	180	180
	Appropriate Model	Correlation Coefficient	.222**	1.000	.328**	.278**	.267**	.410**
		Sig. (2-tailed)	.003	.	.000	.000	.000	.000
		N	180	180	180	180	180	180
	OE Status of Port Organisation	Correlation Coefficient	.241**	.328**	1.000	.286**	.302**	.411**
		Sig. (2-tailed)	.001	.000	.	.000	.000	.000
		N	180	180	180	180	180	180
	Guide to Enhance OE	Correlation Coefficient	.175*	.278**	.286**	1.000	.518**	.342**
		Sig. (2-tailed)	.019	.000	.000	.	.000	.000
		N	180	180	180	180	180	180
	Guide for Strategic Planning	Correlation Coefficient	.087	.267**	.302**	.518**	1.000	.260**
		Sig. (2-tailed)	.248	.000	.000	.000	.	.000
		N	180	180	180	180	180	180
	Strengths and Weaknesses	Correlation Coefficient	.375**	.410**	.411**	.342**	.260**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.
		N	180	180	180	180	180	180

\*\* .Correlation is significant at the .01 level (2-tailed).

\* .Correlation is significant at the .05 level (2-tailed).

## Appendix 11: Correlations Result

## Correlations

			Greater OP due to Higher OE	Impacts of Greater OP on National Development	Impacts of Greater OP on National Socio-economic Development	Impacts of Greater OP on Country's Share of International Transit Trade	Contribution of Greater OP to Gaining a Maritime Competitive Advantage
Spearman's rho	Greater OP due to Higher OE	Correlation Coefficient	1.000	.344**	.392**	.402**	.238**
		Sig. (2-tailed)	.	.000	.000	.000	.001
		N	180	180	180	180	180
	Impacts of Greater OP on National Development	Correlation Coefficient	.344**	1.000	.673**	.454**	.391**
		Sig. (2-tailed)	.000	.	.000	.000	.000
		N	180	180	180	180	180
	Impacts of Greater OP on National Socio-economic Development	Correlation Coefficient	.392**	.673**	1.000	.465**	.413**
		Sig. (2-tailed)	.000	.000	.	.000	.000
		N	180	180	180	180	180
	Impacts of Greater OP on Country's Share of International Transit Trade	Correlation Coefficient	.402**	.454**	.465**	1.000	.640**
		Sig. (2-tailed)	.000	.000	.000	.	.000
		N	180	180	180	180	180
	Contribution of Greater OP to Gaining a Maritime Competitive Advantage	Correlation Coefficient	.238**	.391**	.413**	.640**	1.000
		Sig. (2-tailed)	.001	.000	.000	.000	.
		N	180	180	180	180	180

\*\* . Correlation is significant at the .01 level (2-tailed).



# Appendix 12: Descriptive Analysis of Input Data

Figure 1: PSO Managers' Responses to Leadership Criterion at Input Phase

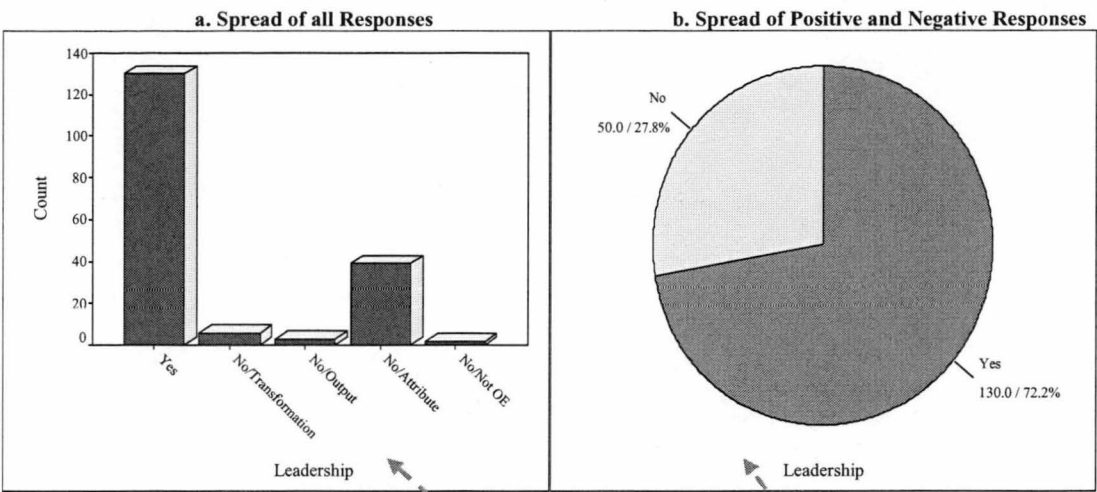


Table 1: PSO Managers' Responses to Leadership Criterion at Input Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Leadership	Yes		130	72.2	130 (72.2%)	
	No	Transformation	6	3.3	50 (27.8%)	12.0
		Output	3	1.7		6.0
		Attribute	39	21.7		78.0
		Not OE	2	1.1		4.0
Total			180	100%	180 (100%)	100%

Figure 2: Spread of Negative Responses of Leadership

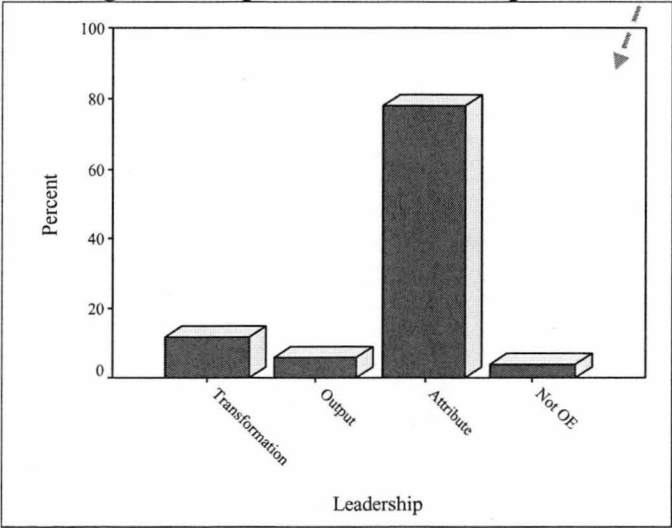


Figure 3: PSO Managers' Responses to Reliability Criterion at Input Phase

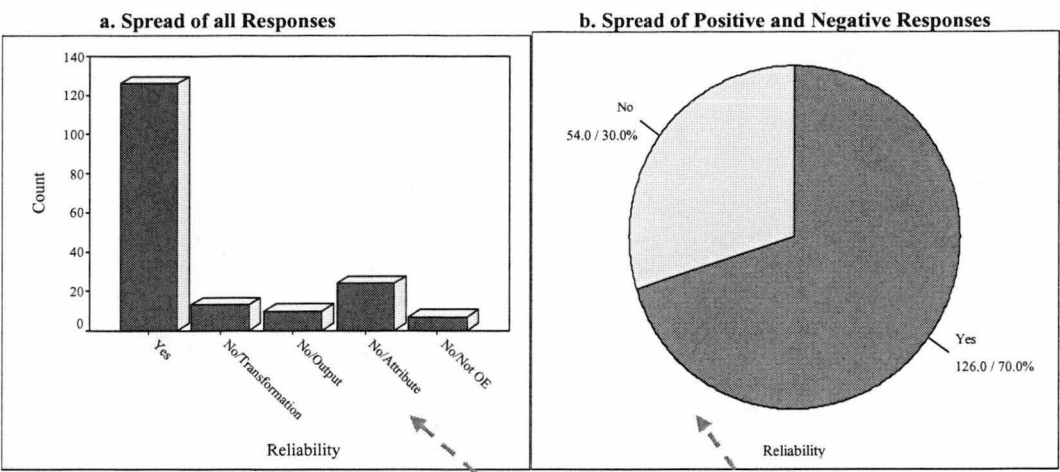
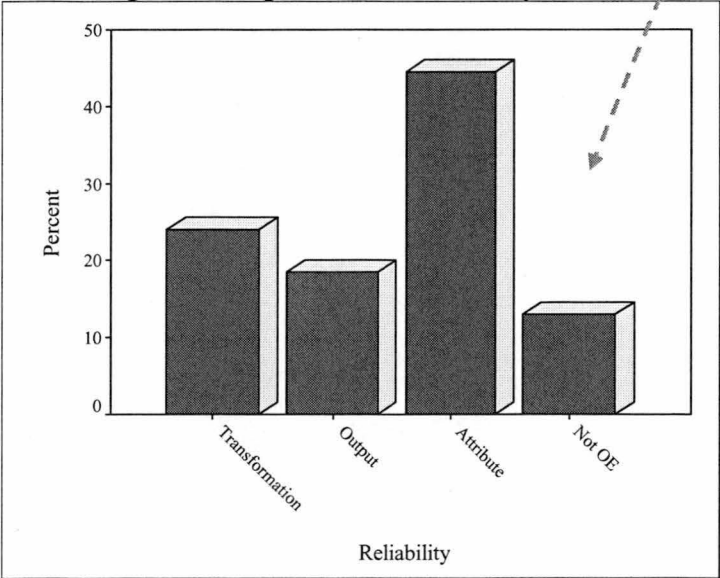


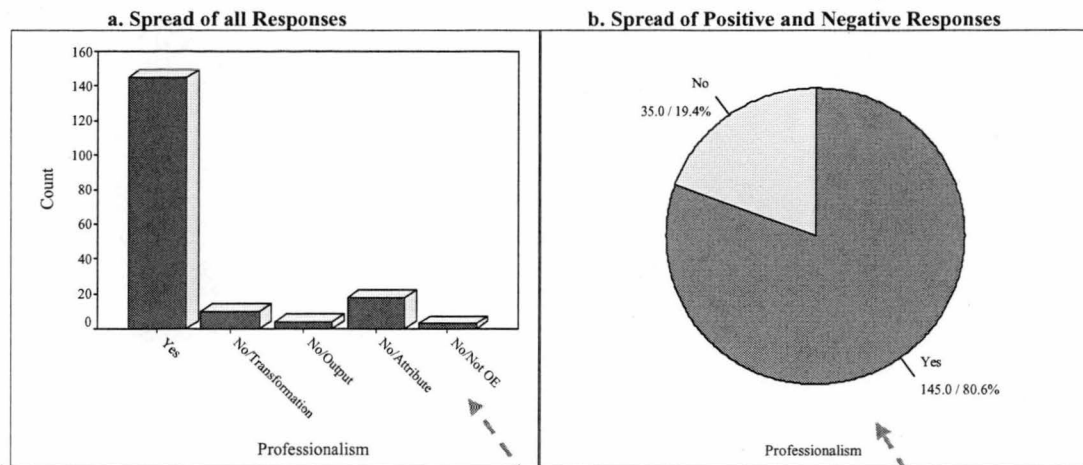
Table 2: PSO Managers' Responses to Reliability Criterion at Input Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Reliability	Yes		126	70.0	126 (70.0%)	
	No	Transformation	13	7.2	54 (30.0%)	24.1
		Output	10	5.6		18.5
		Attribute	24	13.3		44.4
		Not OE	7	3.9		13.0
Total			180	100%	180 (100%)	100%

Figure 4: Spread of Negative Responses of Reliability



**Figure 5: PSO Managers' Responses to Professionalism Criterion at Input Phase**



**Table 3: PSO Managers' Responses to Professionalism Criterion at Input Phase**

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Professionalism	Yes		145	80.6	145 (80.6%)	
	No	Transformation	10	5.6	35 (19.4%)	28.6
		Output	4	2.2		11.4
		Attribute	18	10.0		51.4
		Not OE	3	1.7		8.6
Total			180	100%	180 (100%)	100%

**Figure 6: Spread of Negative Responses of Professionalism**

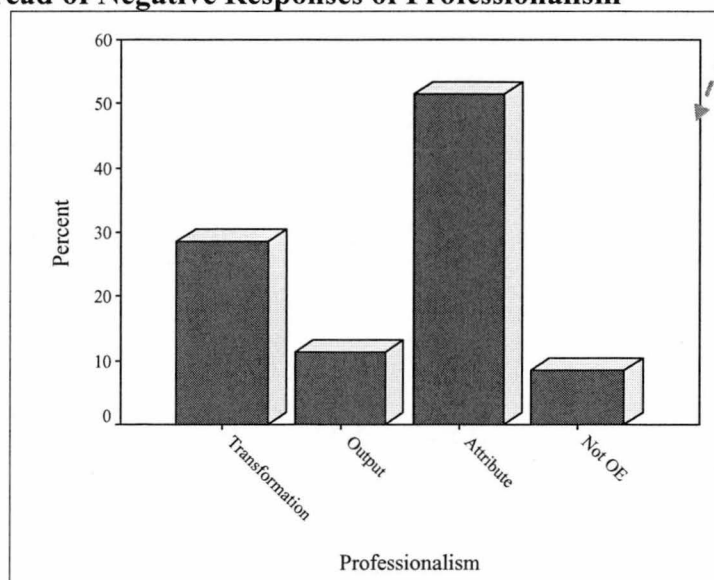


Figure 7: PSO Managers' Responses to Autonomy Criterion at Input Phase

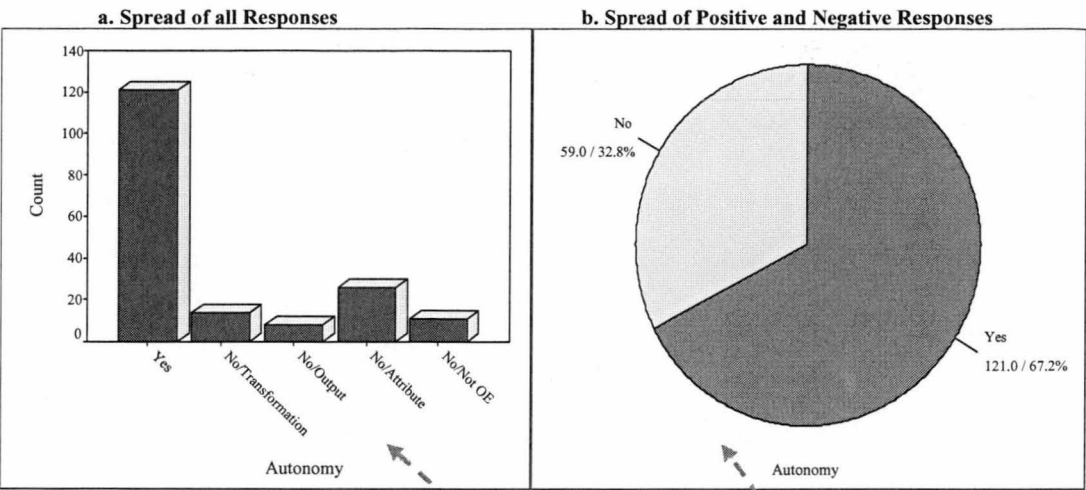


Table 4: PSO Managers' Responses to Autonomy Criterion at Input Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Autonomy	Yes		121	67.2	121 (67.2%)	
	No	Transformation	14	7.8	59 (32.8%)	23.7
		Output	6	4.4		13.6
		Attribute	26	14.4		44.1
		Not OE	11	6.1		18.6
Total			180	100%	180 (100%)	100%

Figure 8: Spread of Negative Responses of Autonomy

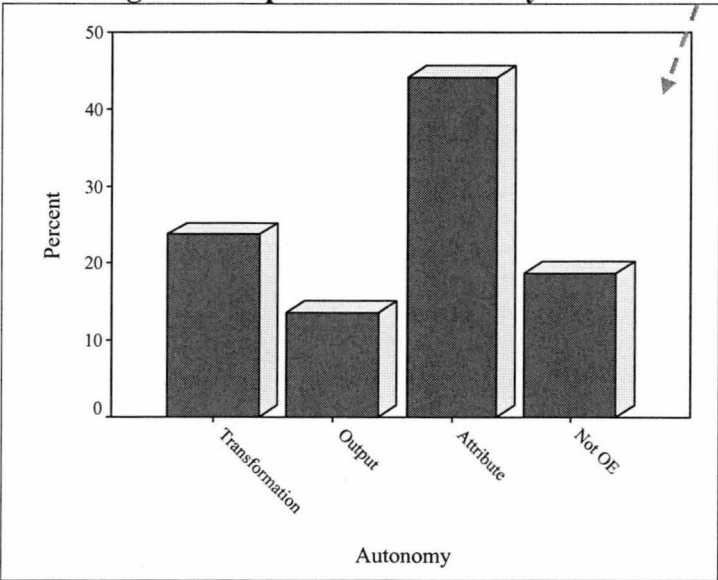


Figure 9: PSO Managers' Responses to Human Behaviour Criterion at Input Phase

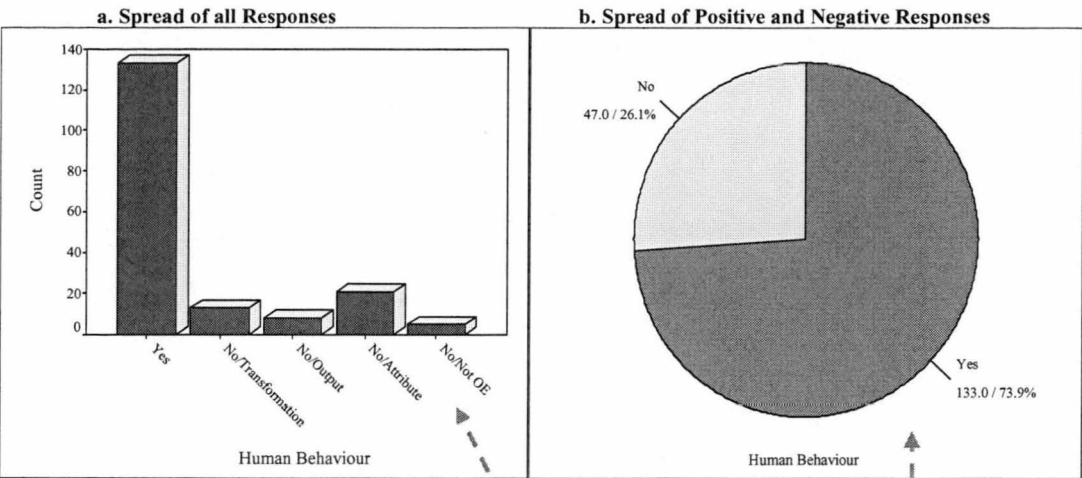
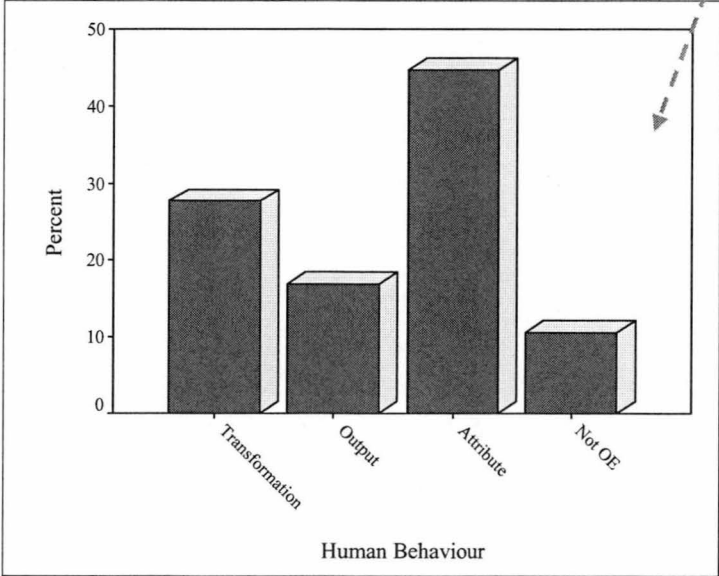


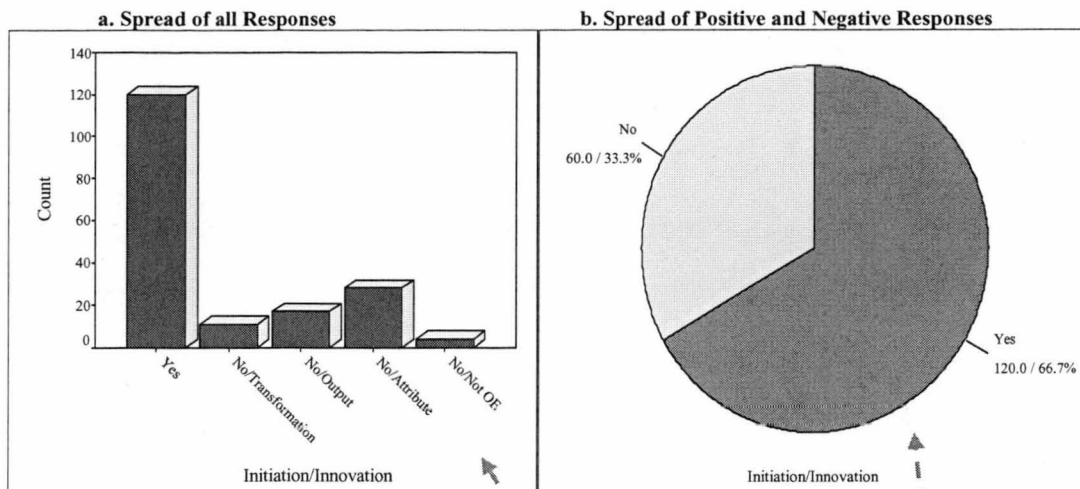
Table 5: PSO Managers' Responses to Human Behaviour Criterion at Input Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Human Behaviour	Yes		133	73.9	133 (73.9%)	
	No	Transformation	13	7.2	47 (26.1%)	27.7
		Output	8	4.4		17.0
		Attribute	21	11.7		44.7
		Not OE	5	2.8		10.6
Total			180	100%	180 (100%)	100%

Figure 10: Spread of Negative Responses of Human Behaviour



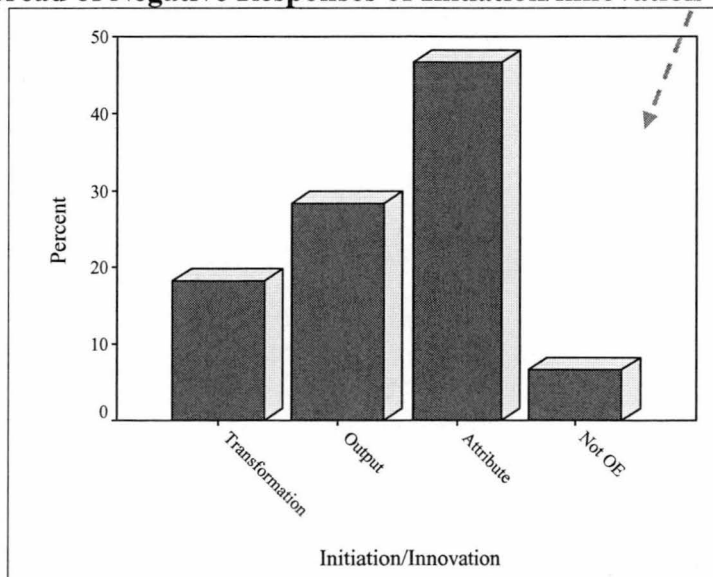
**Figure 11: PSO Managers' Responses to Initiation/innovation Criterion at Input Phase**



**Table 6: PSO Managers' Responses to Initiation/innovation Criterion at Input Phase**

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Initiation/ innovation	Yes		120	66.7	120 (66.7%)	
	No	Transformation	11	6.1	60 (33.3%)	18.3
		Output	17	9.4		28.3
		Attribute	28	15.6		46.7
		Not OE	4	2.2		6.7
Total			180	100%	180 (100%)	100%

**Figure 12: Spread of Negative Responses of Initiation/innovation**



# Appendix 13: Descriptive Analysis of Transformation Data

Figure 1: PSO Managers' Responses to Planning Criterion at Transformation Phase

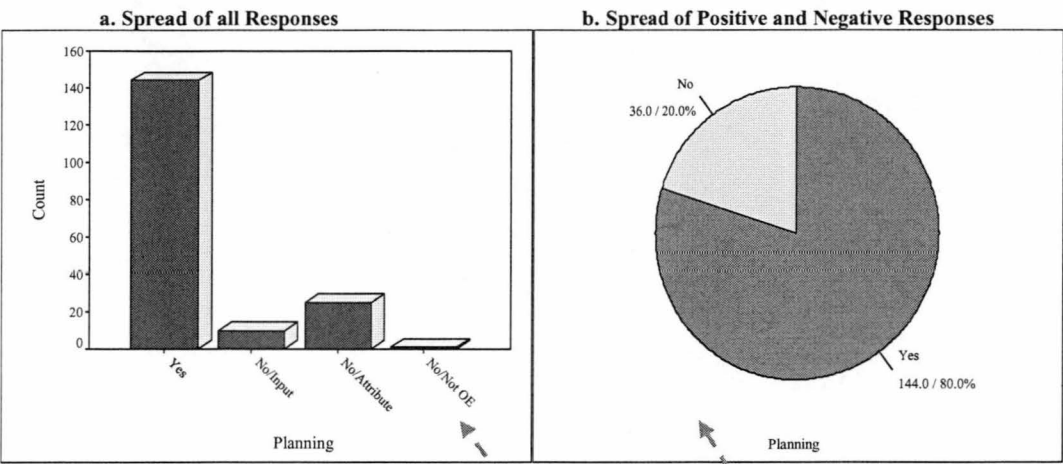


Table 1: PSO Managers' Responses to Planning Criterion at Transformation Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Planning	Yes		144	80.0	144 (80.0%)	
	No	Input	10	5.6	36 (20.0%)	27.8
		Output	0	0.0		0.0
		Attribute	25	13.9		69.4
		Not OE	1	0.6		2.8
Total			180	100%	180 (100%)	100%

Figure 2: Spread of Negative Responses of Planning

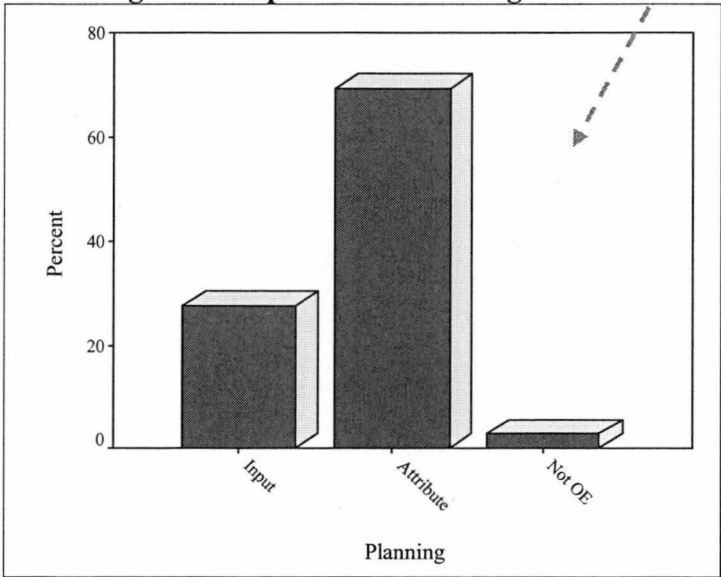




Figure 3: PSO Managers' Responses to Evaluation Criterion at Transformation Phase

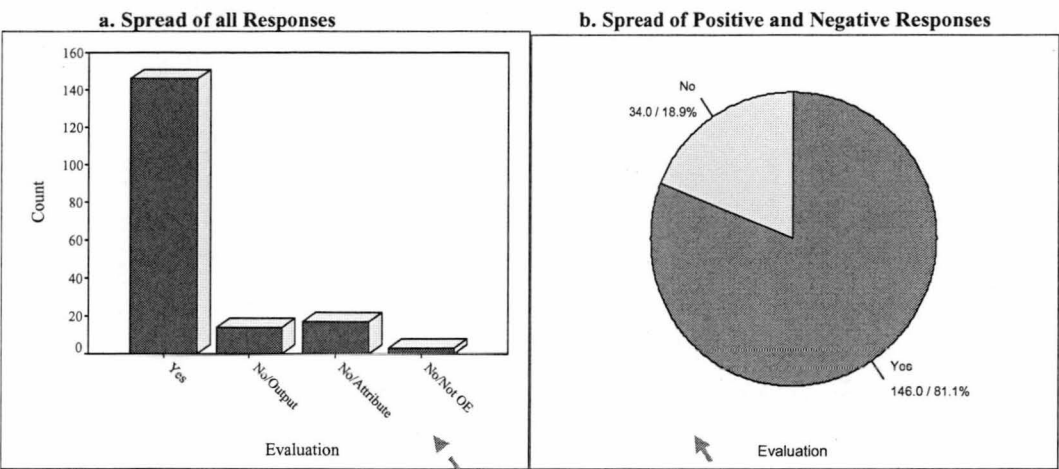
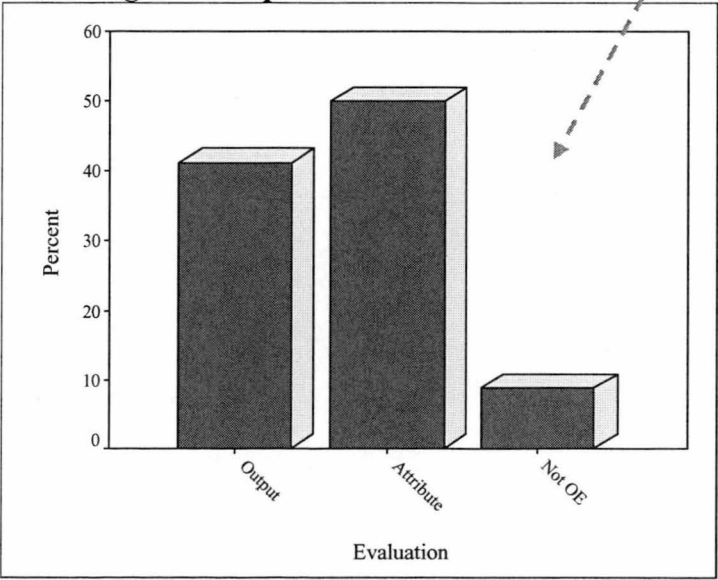


Table 2: PSO Managers' Responses to Evaluation Criterion at Transformation Phase

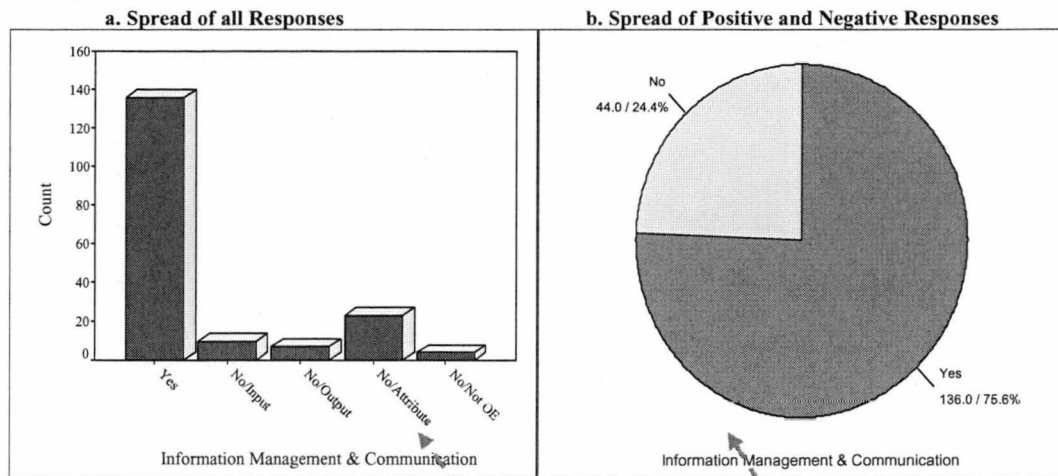
		Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Evaluation	Yes	146	81.1	146 (81.1%)	
	No	Input	0	34 (18.9%)	0.0
		Output	14		41.2
		Attribute	17		50.0
		Not OE	3		8.8
Total		180	100%	180 (100%)	100%

Figure 4: Spread of Negative Responses of Evaluation





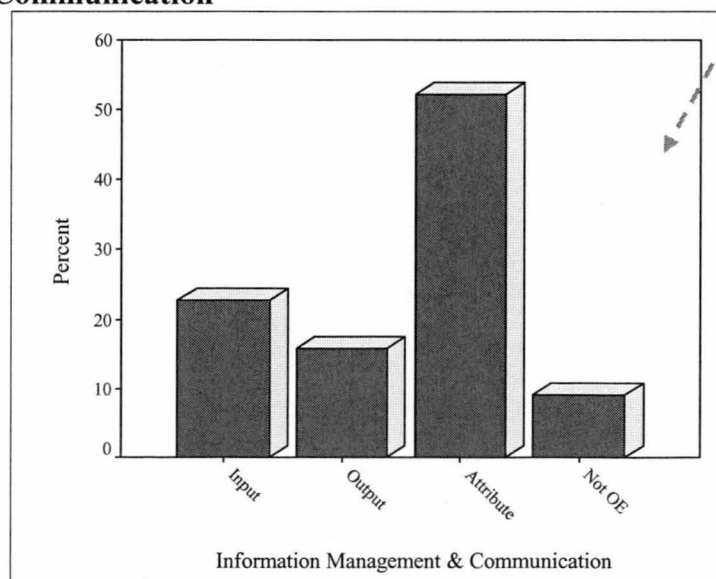
**Figure 5: PSO Managers' Responses to Information Management and Communication Criterion at Transformation Phase**



**Table 3: PSO Managers' Responses to Information Management and Communication Criterion at Transformation Phase**

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Information Management & Communication	Yes		136	75.6	136 (75.6%)	
	No	Input	10	5.6	44 (24.4%)	22.7
		Output	7	3.9		15.9
		Attribute	23	12.8		52.3
		Not OE	4	2.2		9.1
Total			180	100%	180 (100%)	100%

**Figure 6: Spread of Negative Responses of Information Management & Communication**



# Appendix 14: Descriptive Analysis of Output Data

Figure 1: PSO Managers' Responses to Productivity Criterion at Output Phase

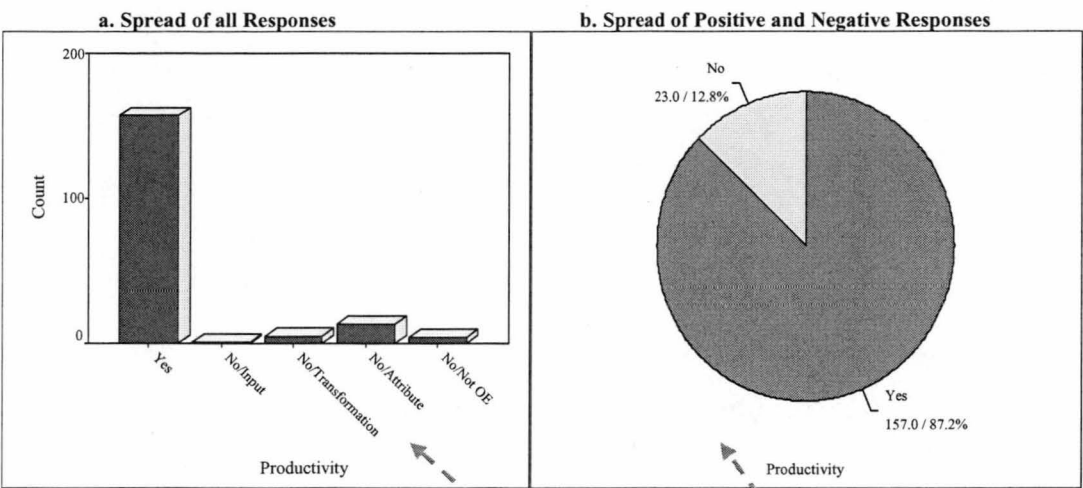


Table 1: PSO Managers' Responses to Productivity Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Productivity	Yes		157	87.2	157 (87.2%)	
	No	Input	1	0.6	23 (12.8%)	4.3
		Transformation	5	2.8		21.7
		Attribute	13	7.2		56.5
		Not OE	4	2.2		17.4
Total			180	100%	180 (100%)	100%

Figure 2: Spread of Negative Responses of Productivity

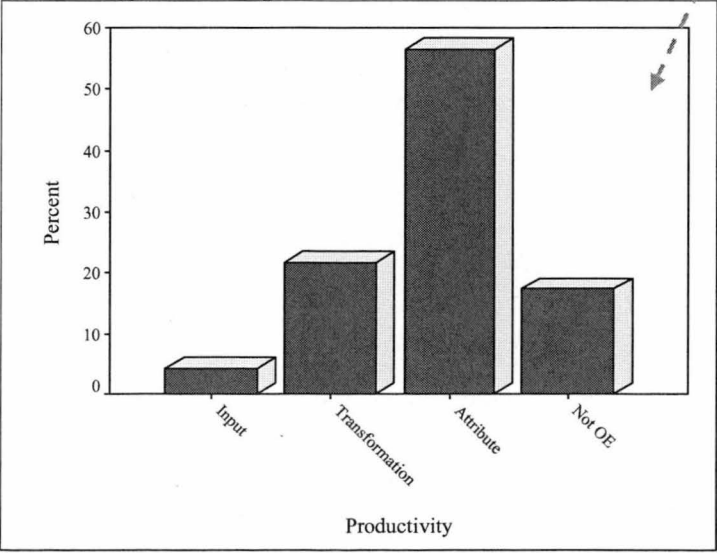


Figure 3: PSO Managers' Responses to Quality Criterion at Output Phase

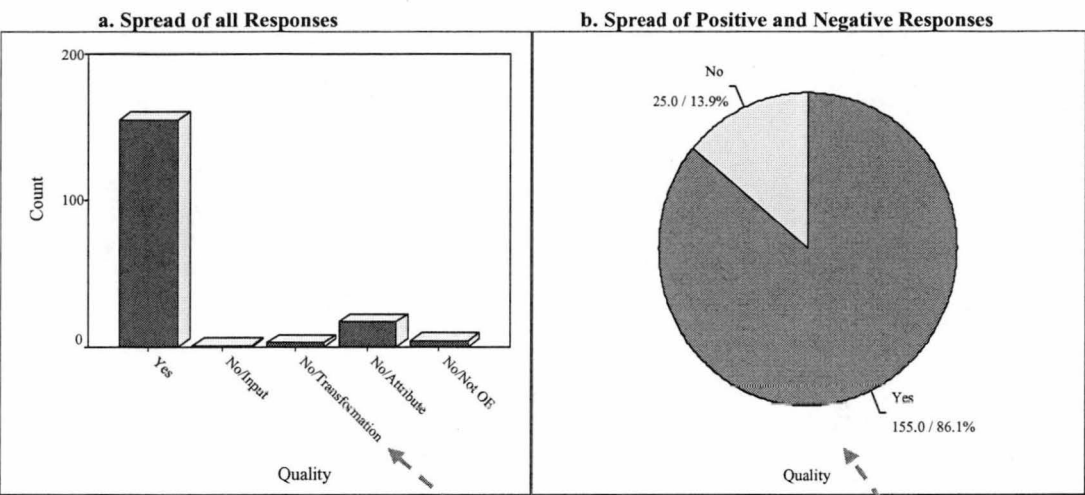


Table 2: PSO Managers' Responses to Quality Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Quality	Yes		155	86.1	155 (86.1%)	
	No	Input	1	0.6	25 (13.9%)	4.0
		Transformation	3	1.7		12.0
		Attribute	17	9.4		68.0
		Not OE	4	2.2		16.0
Total			180	100%	180 (100%)	100%

Figure 4: Spread of Negative Responses of Quality

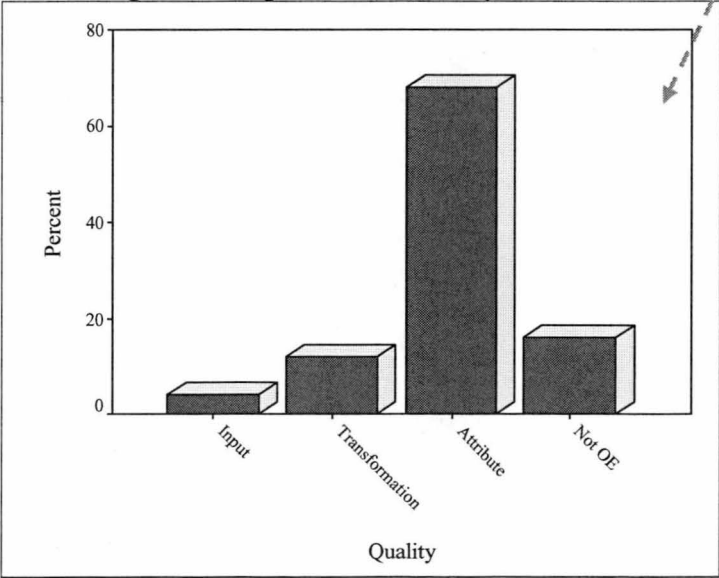


Figure 5: PSO Managers' Responses to Profitability Criterion at Output Phase

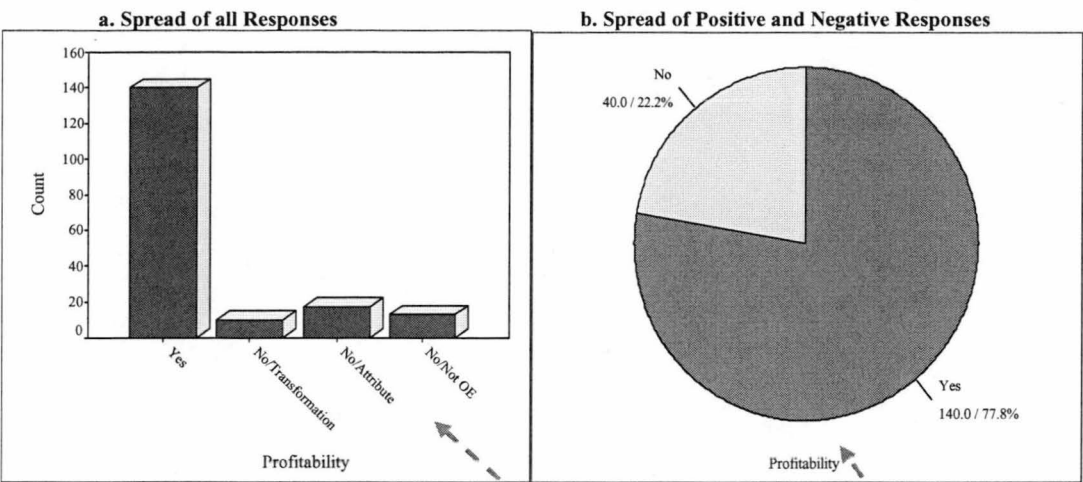


Table 3: PSO Managers' Responses to Profitability Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Profitability	Yes		140	77.8	140 (77.8%)	
	No	Input	0	0.0	40 (22.2%)	0.0
		Transformation	10	5.6		25.0
		Attribute	17	9.4		42.5
		Not OE	13	7.2		32.5
Total			180	100%	180 (100%)	100%

Figure 6: Spread of Negative Responses of Profitability

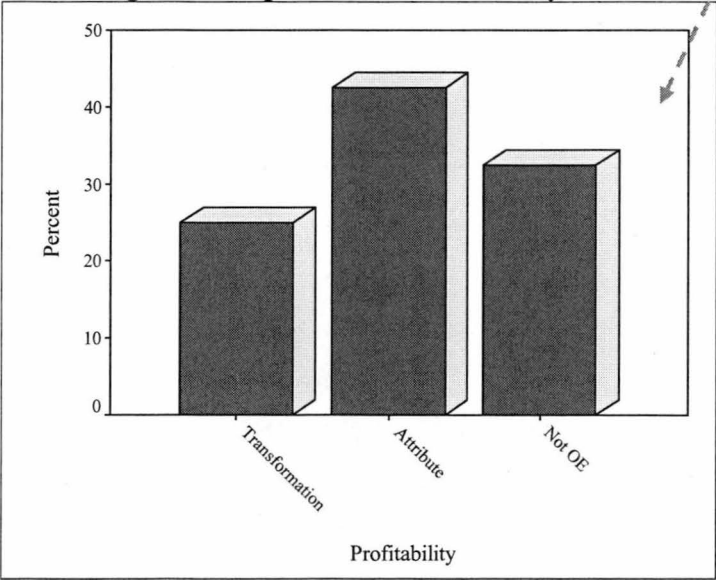


Figure 7: PSO Managers' Responses to Turnover Criterion at Output Phase

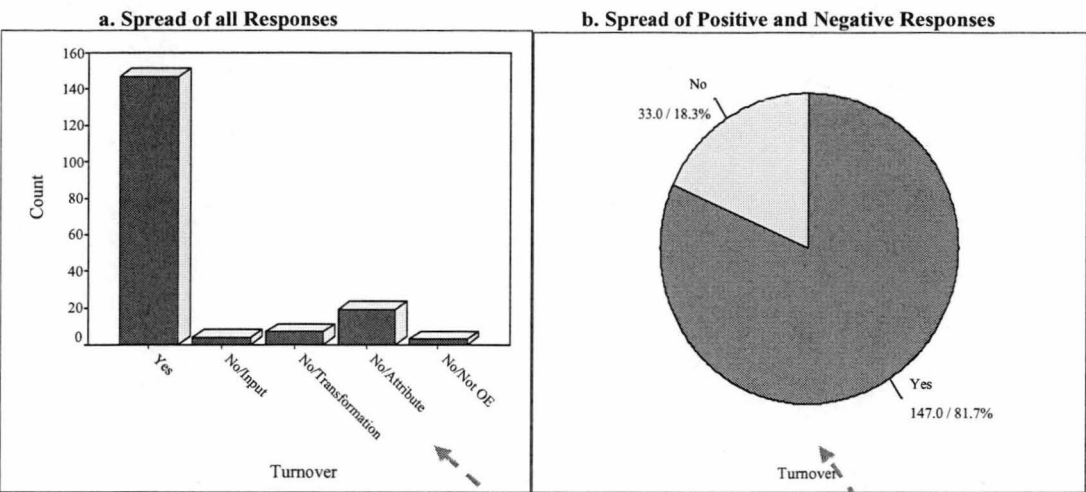


Table 4: PSO Managers' Responses to Turnover Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Turnover	Yes		147	81.7	147 (81.7%)	
	No	Input	4	2.2	33 (18.3%)	12.1
		Transformation	7	3.9		21.2
		Attribute	19	10.6		57.6
		Not OE	3	1.7		9.1
Total			180	100%	180 (100%)	100%

Figure 8: Spread of Negative Responses of Turnover

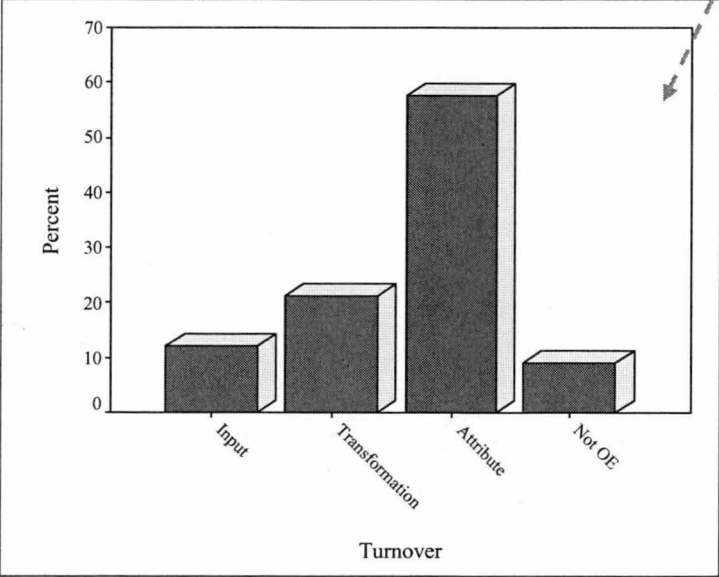


Figure 9: PSO Managers' Responses to Goal Attainment Criterion at Output Phase

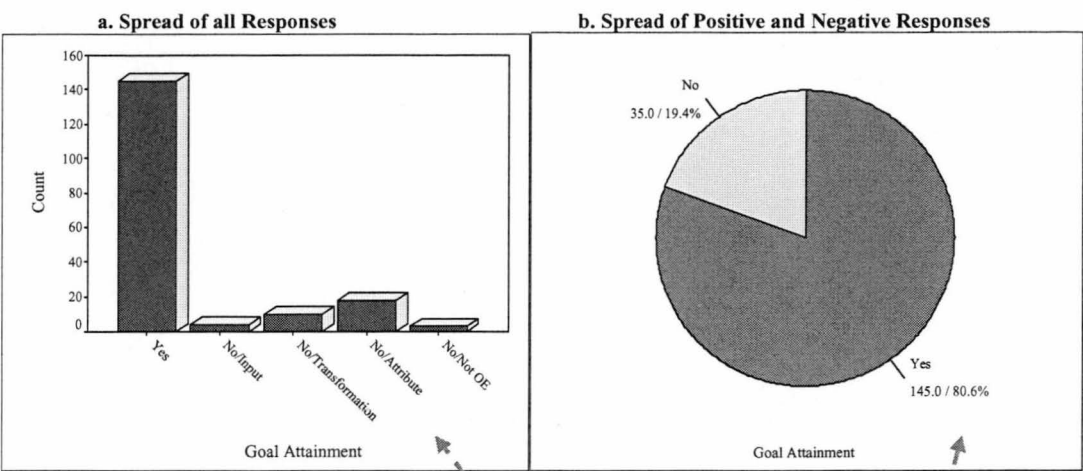


Table 5: PSO Managers' Responses to Goal Attainment Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Goal Attainment	Yes		145	80.6	145 (80.6%)	
	No	Input	4	2.2	35 (19.4%)	
		Transformation	10	5.6		
		Attribute	18	10.0		
		Not OE	3	1.7		
Total			180	100%	180 (100%)	

Figure 10: Spread of Negative Responses of Goal Attainment

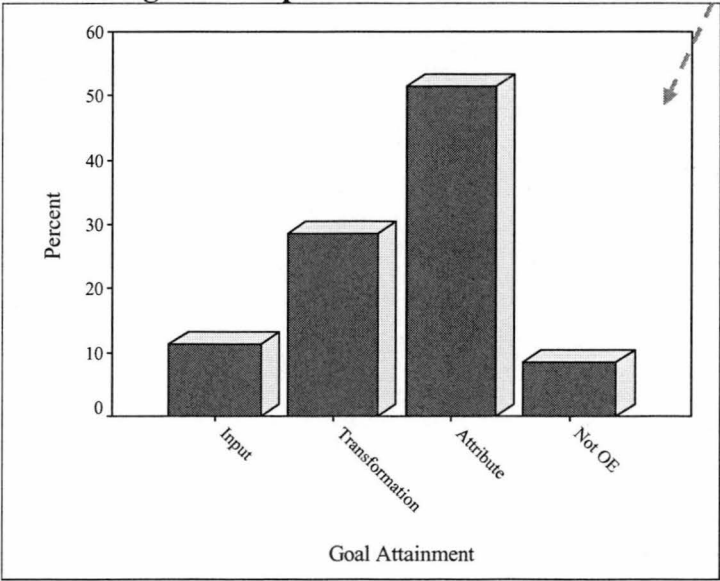


Figure 11: PSO Managers' Responses to Efficiency Criterion at Output Phase

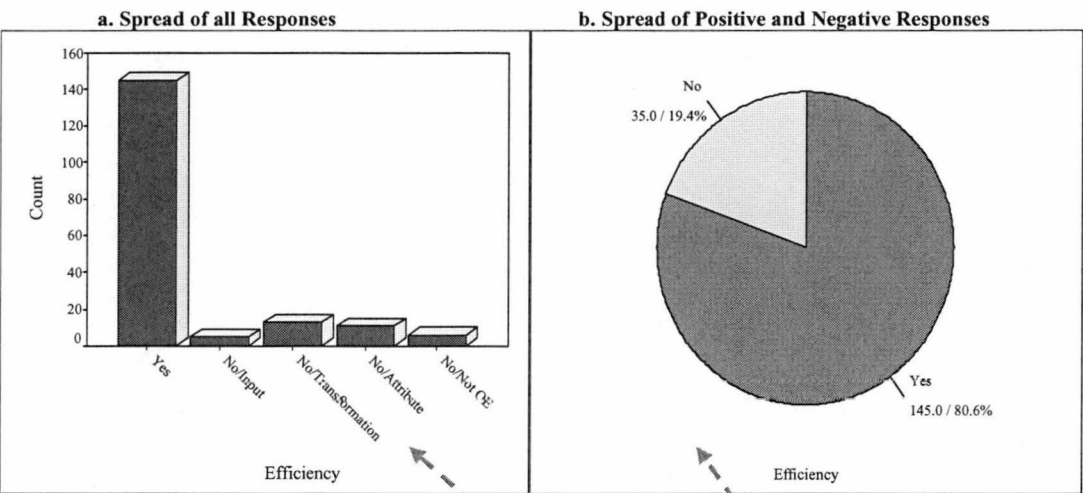


Table 6: PSO Managers' Responses to Efficiency Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Efficiency	Yes		145	80.6	145 (80.6%)	
	No	Input	5	2.8	35 (19.4%)	14.3
		Transformation	13	7.2		37.1
		Attribute	11	6.1		31.4
		Not OE	6	3.3		17.1
Total			180	100%	180 (100%)	100%

Figure 12: Spread of Negative Responses of Efficiency

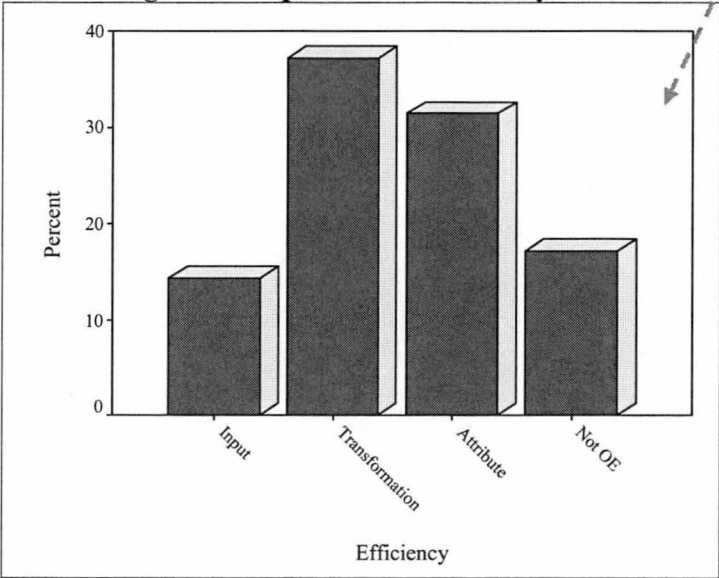




Figure 13: PSO Managers’ Responses to Growth Criterion at Output Phase

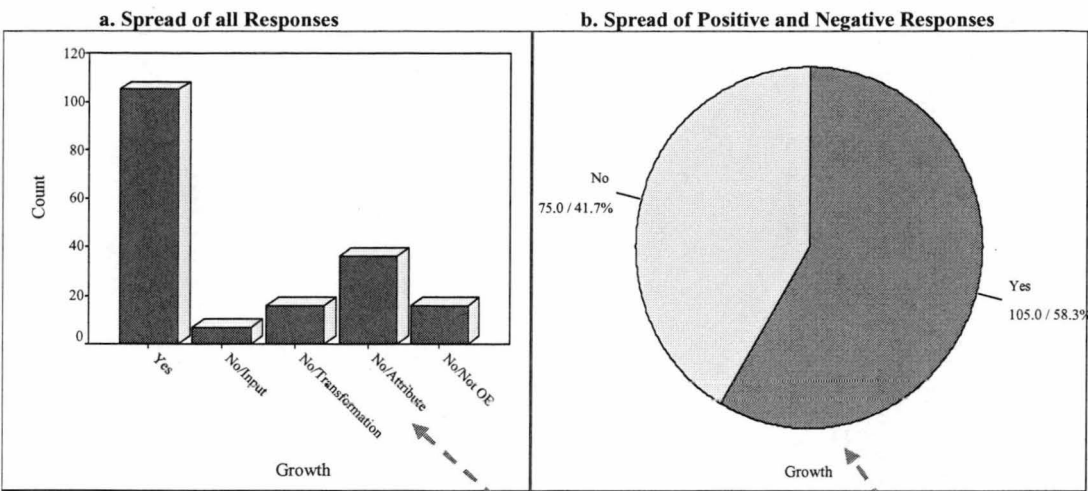


Table 7: PSO Managers’ Responses to Growth Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Growth	Yes		105	58.3	105 (58.3%)	
	No	Input	7	3.9	75 (41.7%)	9.3
		Transformation	16	8.9		21.3
		Attribute	36	20.0		48.0
		Not OE	16	8.9		21.3
Total			180	100%	180 (100%)	100%

Figure 14: Spread of Negative Responses of Growth

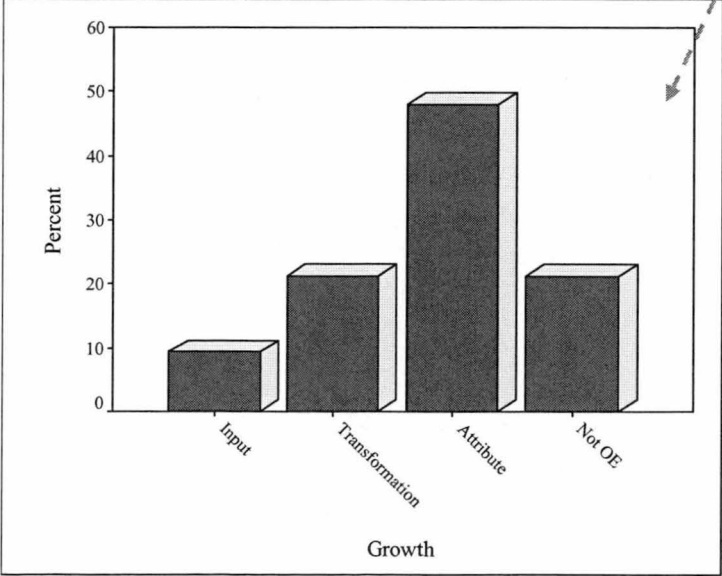




Figure 15: PSO Managers' Responses to Stability Criterion at Output Phase

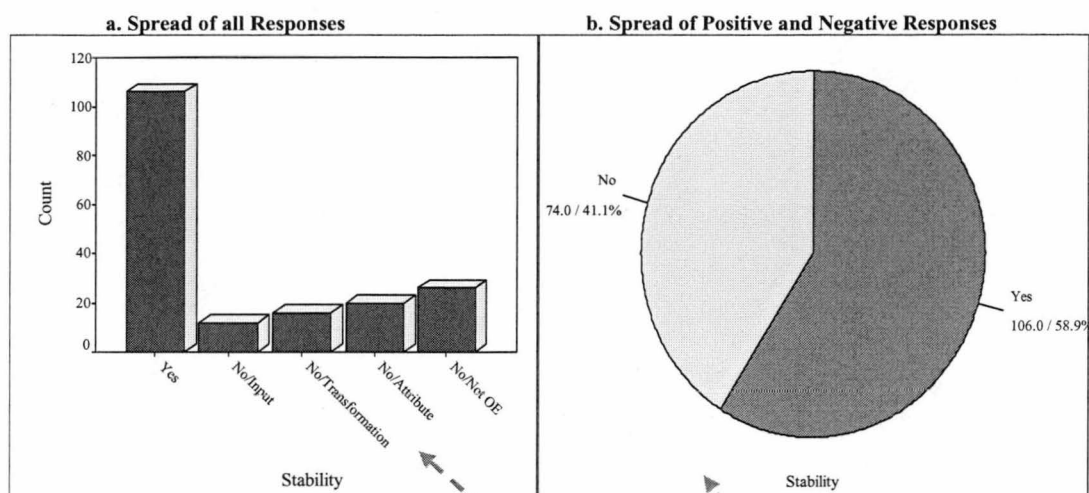
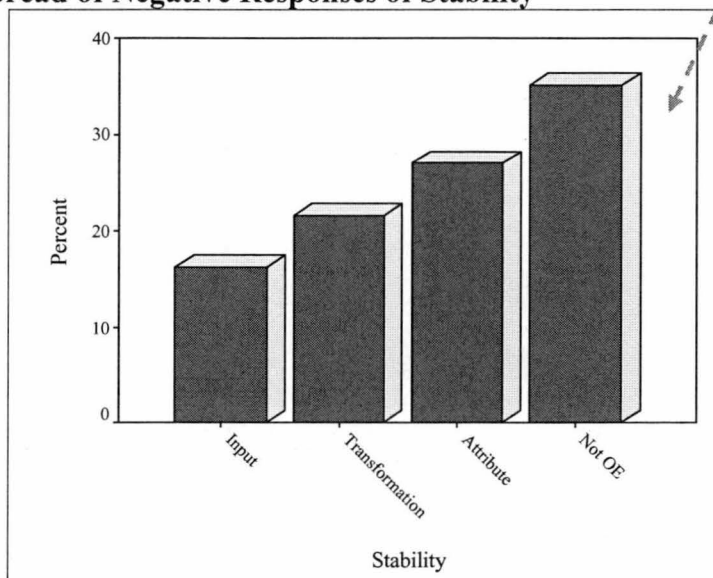


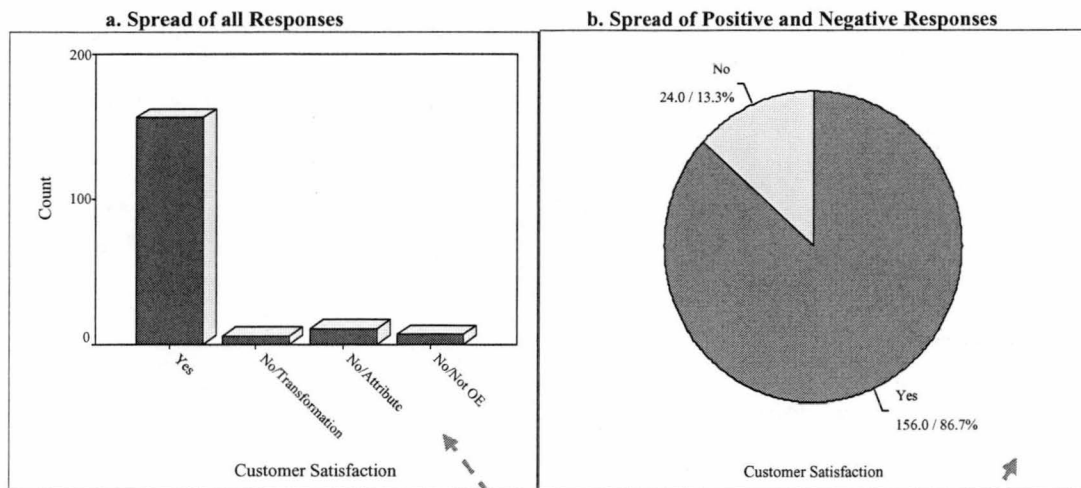
Table 8: PSO Managers' Responses to Stability Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Stability	Yes		106	58.9	106 (58.9%)	
	No	Input	12	6.7	74 (41.1%)	16.2
		Transformation	16	8.9		21.6
		Attribute	20	11.1		27.0
		Not OE	26	14.4		35.1
Total			180	100%	180 (100%)	100%

Figure 16: Spread of Negative Responses of Stability



**Figure 17: PSO Managers' Responses to Customer Satisfaction Criterion at Output Phase**



**Table 9: PSO Managers' Responses to Customer Satisfaction Criterion at Output Phase**

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Customer Satisfaction	Yes		156	86.7	156 (86.7%)	
	No	Input	0	0.0	24 (13.3%)	0.0
		Transformation	6	3.3		25.0
		Attribute	11	6.1		45.8
		Not OE	7	3.9		29.2
Total			180	100%	180 (100%)	100%

**Figure 18: Spread of Negative Responses of Customer Satisfaction**

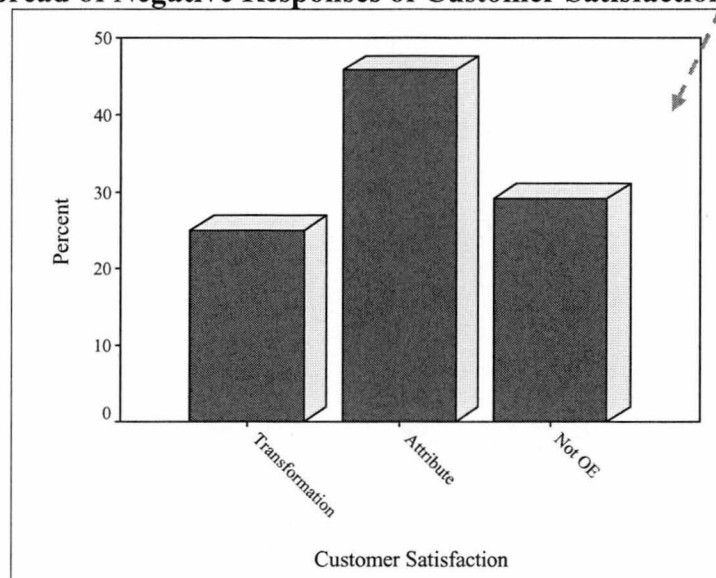


Figure 19: PSO Managers' Responses to Employee Satisfaction Criterion at Output Phase

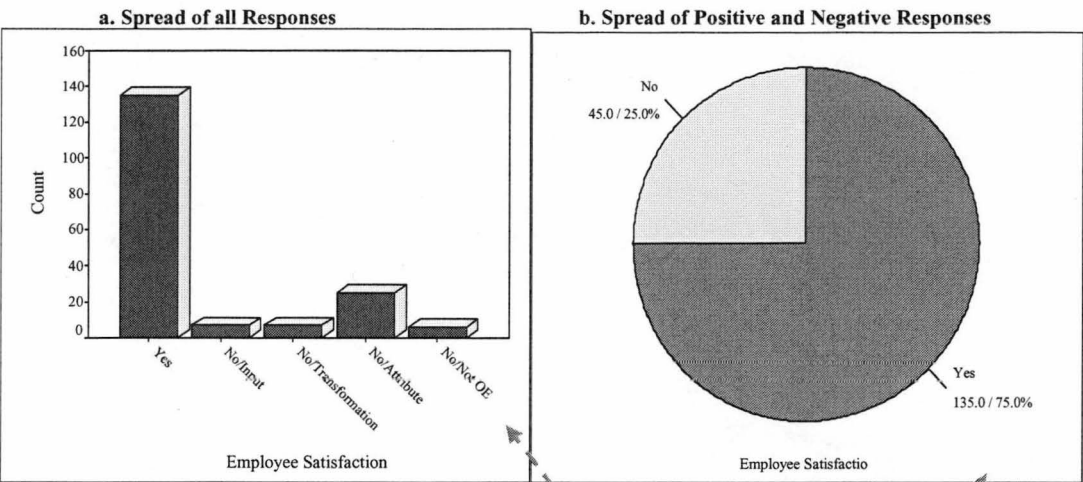
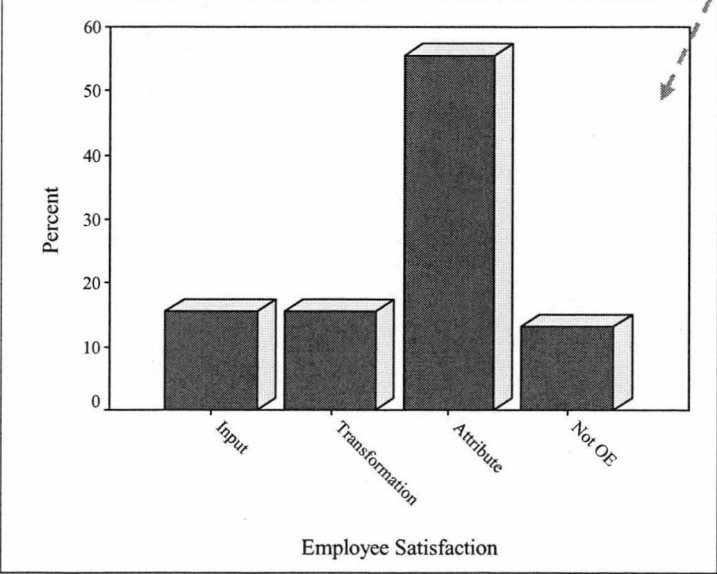


Table 10: PSO Managers' Responses to Employee Satisfaction Criterion at Output Phase

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Employee Satisfaction	Yes		135	75.0	135 (75.0%)	
	No	Input	7	3.9	45 (25.0%)	15.6
		Transformation	7	3.9		15.6
		Attribute	25	13.9		55.6
		Not OE	6	3.3		13.3
Total			180	100%	180 (100%)	100%

Figure 20: Spread of Negative Responses of Employee Satisfaction



# Appendix 15: Descriptive Analysis of OE Attributes

Figure 1: PSO Managers' Responses to Adaptability as an OE Attribute

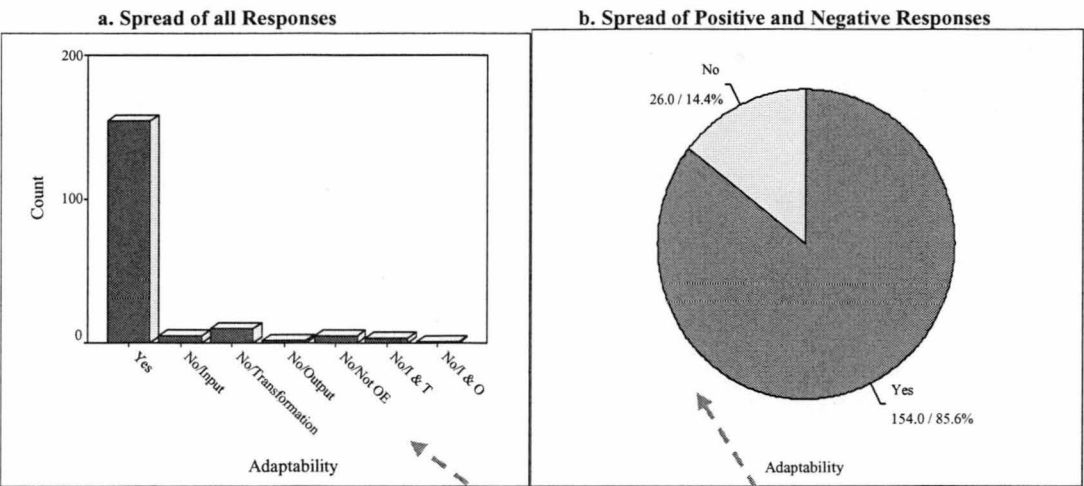


Table 1: PSO Managers' Responses to Adaptability as an OE Attribute

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Adaptability	Yes		154	85.6	154 (85.6%)	
	No	Input	5	2.8	26 (14.4%)	19.2
		Transformation	10	5.6		38.5
		Output	2	1.1		7.7
		Not OE	5	2.8		19.2
		I & T	3	1.7		11.5
		I & O	1	0.6		3.8
		T & O	0	0.0		0.0
		Total		180		100%

Figure 2: Spread of Negative Responses of Adaptability

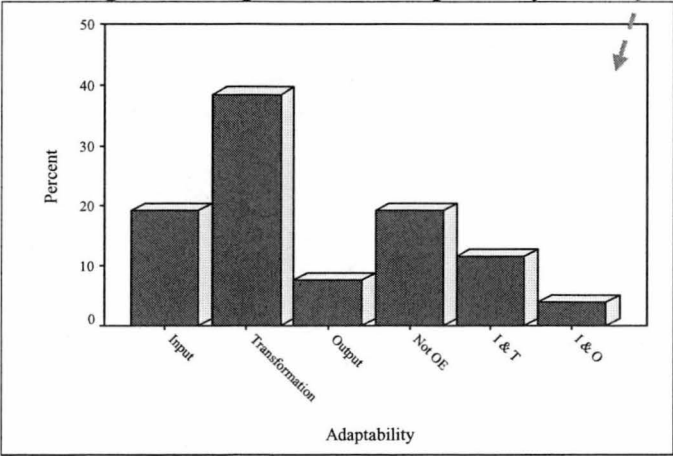


Figure 3: PSO Managers' Responses to Flexibility as an OE Attribute

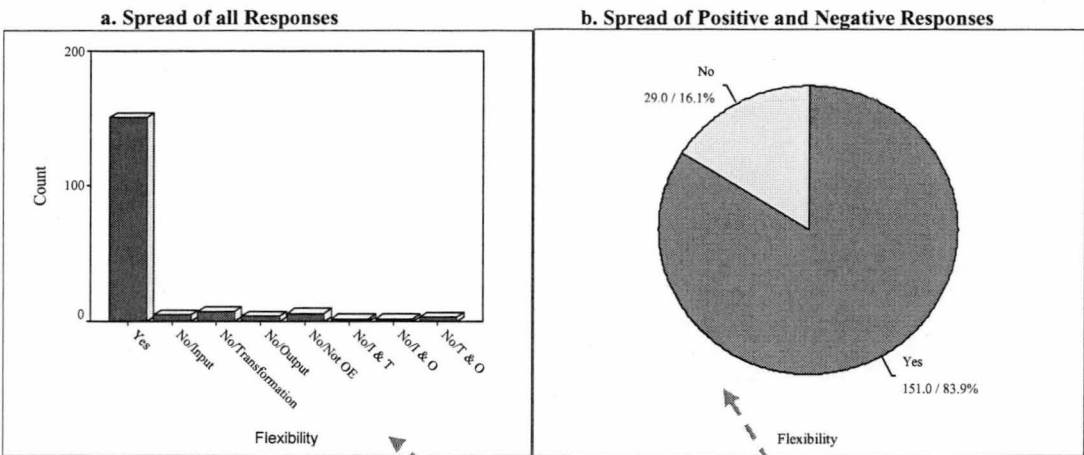


Table 2: PSO Managers' Responses to Flexibility as an OE Attribute

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Flexibility	Yes		151	83.9	151 (83.9%)	
	No	Input	5	2.8	29 (16.1%)	17.2
		Transformation	7	3.9		24.1
		Output	4	2.2		13.8
		Not OE	6	3.3		20.7
		I & T	2	1.1		6.9
		I & O	2	1.1		6.9
		T & O	3	1.7		10.3
	Total		180	100%	180 (100%)	100%

Figure 4: Spread of Negative Responses of Flexibility

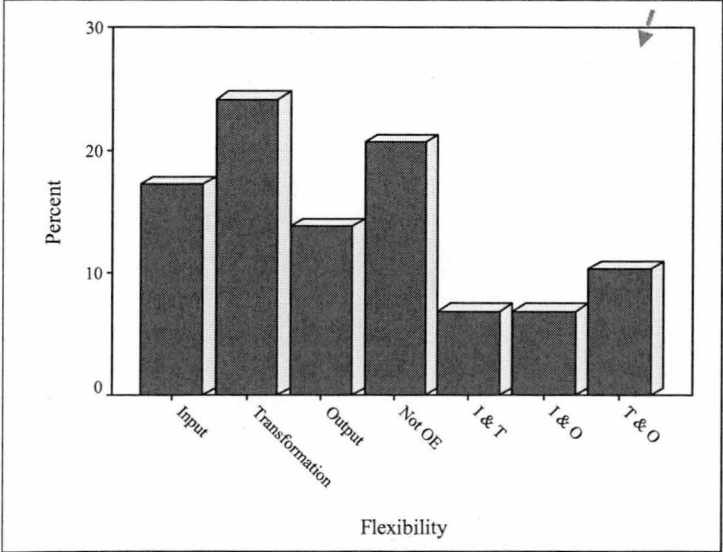


Figure 5: PSO Managers' Responses to Cohesion as an OE Attribute

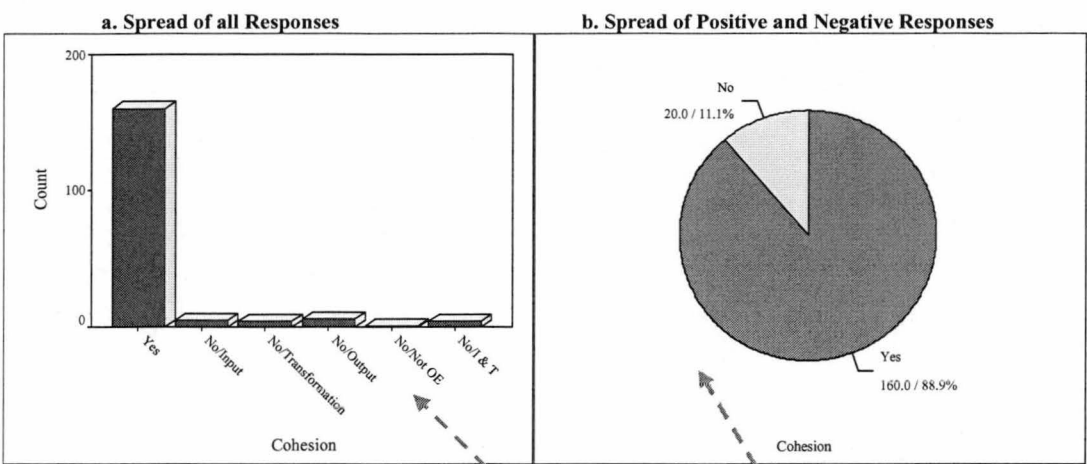


Table 3: PSO Managers' Responses to Cohesion as an OE Attribute

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Cohesion	Yes		160	88.9	160 (88.9%)	
	No	Input	5	2.8	20 (11.1%)	25.0
		Transformation	4	2.2		20.0
		Output	6	3.3		30.0
		Not OE	1	0.6		5.0
		I & T	4	2.2		20.0
		I & O	0	0.0		0.0
		T & O	0	0.0		0.0
	Total		180	100%	180 (100%)	100%

Figure 6: Spread of Negative Responses of Cohesion

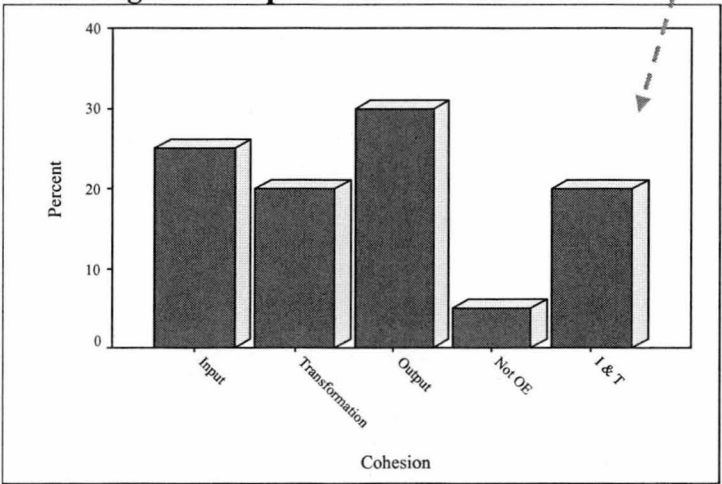


Figure 7: PSO Managers' Responses to Morale as an OE Attribute

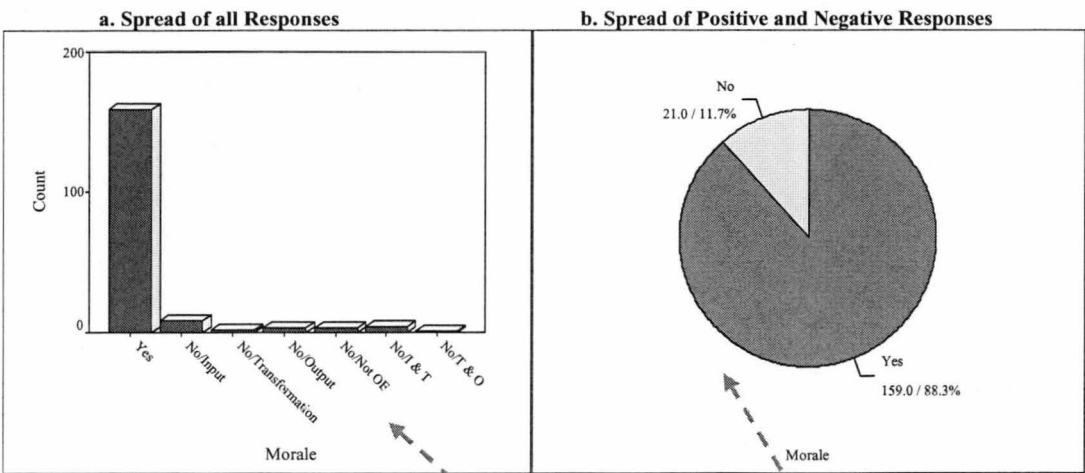


Table 4: PSO Managers' Responses to Morale as an OE Attribute

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Morale	Yes		159	88.3	159 (88.3%)	
	No	Input	8	4.4	21 (11.7%)	38.1
		Transformation	2	1.1		9.5
		Output	3	1.7		14.3
		Not OE	3	1.7		14.3
		I & T	4	2.2		19.0
		I & O	0	0.0		0.0
		T & O	1	0.6		4.8
Total			180	100%	180 (100%)	100%

Figure 8: Spread of Negative Responses of Morale

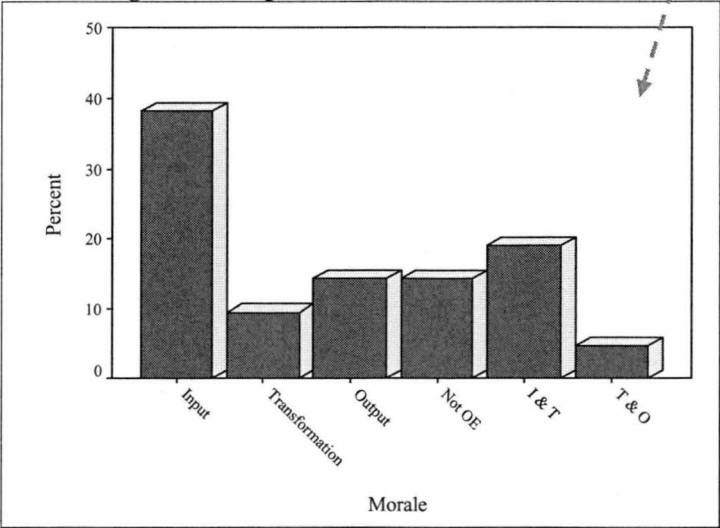




Figure 9: PSO Managers' Responses to Organisation's Worth as an OE Attribute

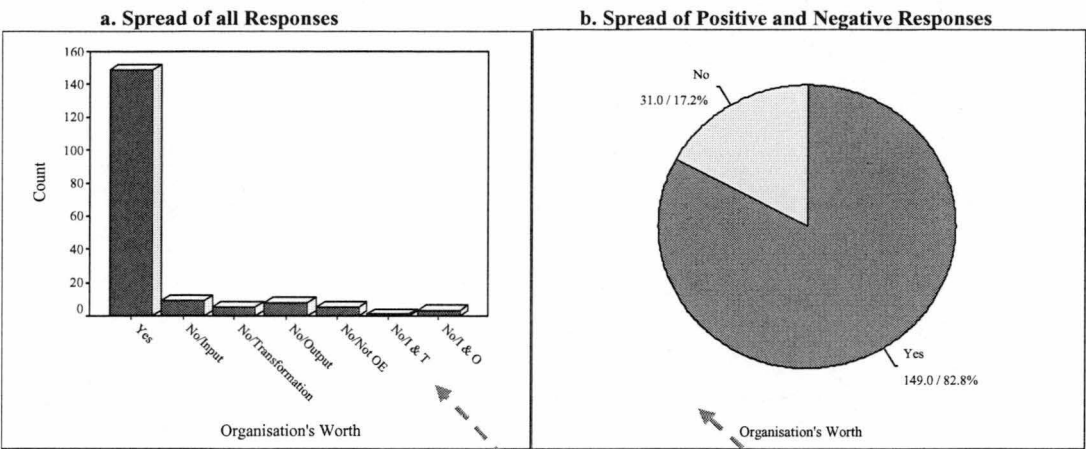


Table 5: PSO Managers' Responses to Organisation's Worth as an OE Attribute

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
Organisation's Worth	Yes		149	82.8	149 (82.8%)	
	No	Input	9	5.0	31 (17.2%)	29.0
		Transformation	5	2.8		16.1
		Output	8	4.4		25.8
		Not OE	5	2.8		16.1
		I & T	1	0.6		3.2
		I & O	3	1.7		9.7
		T & O	0	0.0		0.0
Total			180	100%	180 (100%)	100%

Figure 10: Spread of Negative Responses of Organisation's Worth

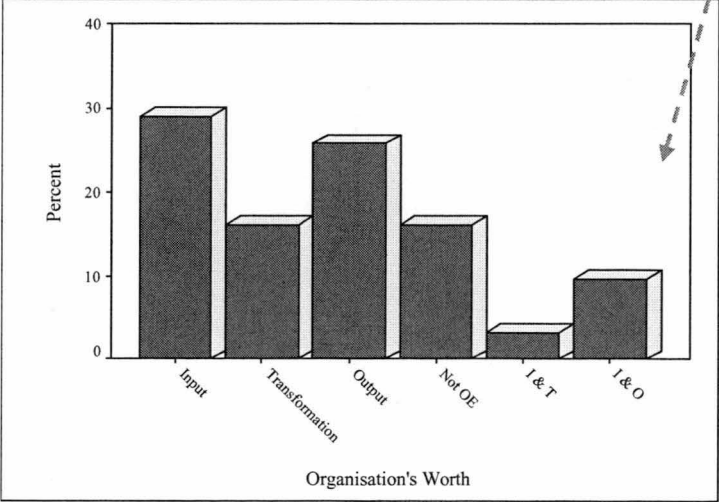




Figure 11: PSO Managers' Responses to HR Development as an OE Attribute

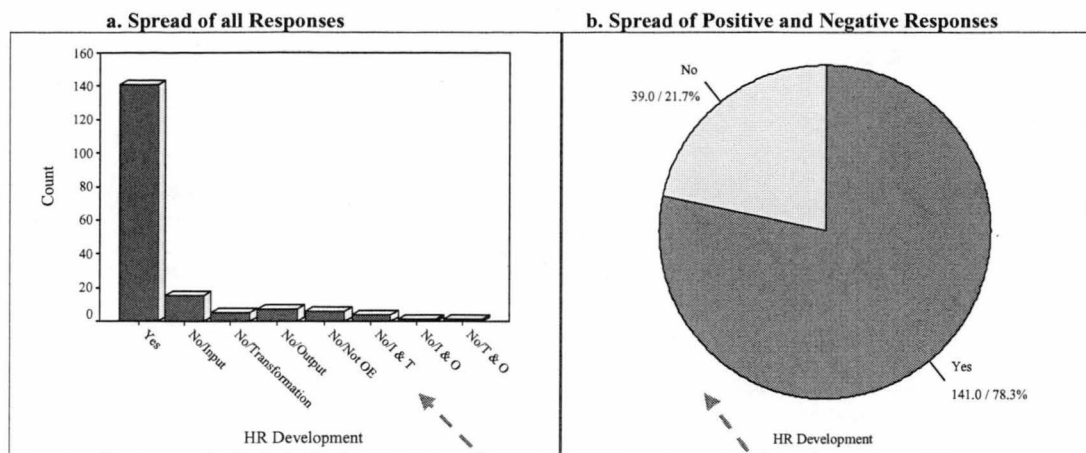


Table 6: PSO Managers' Responses to HR Development as an OE Attribute

			Frequency	Percent (%)	Total (Frq. & %)	Spread of Negative Responses (%)
HR Development	Yes		141	78.3	141 (78.3%)	
	No	Input	15	8.3	39 (21.7%)	38.5
		Transformation	5	2.8		12.8
		Output	7	3.9		17.9
		Not OE	6	3.3		15.4
		I & T	4	2.2		10.3
		I & O	1	0.6		2.6
		T & O	1	0.6		2.6
Total			180	100%	180 (100%)	100%

Figure 12: Spread of Negative Responses of HR Development

